

FARM CHEMICALS

The management magazine of the industry

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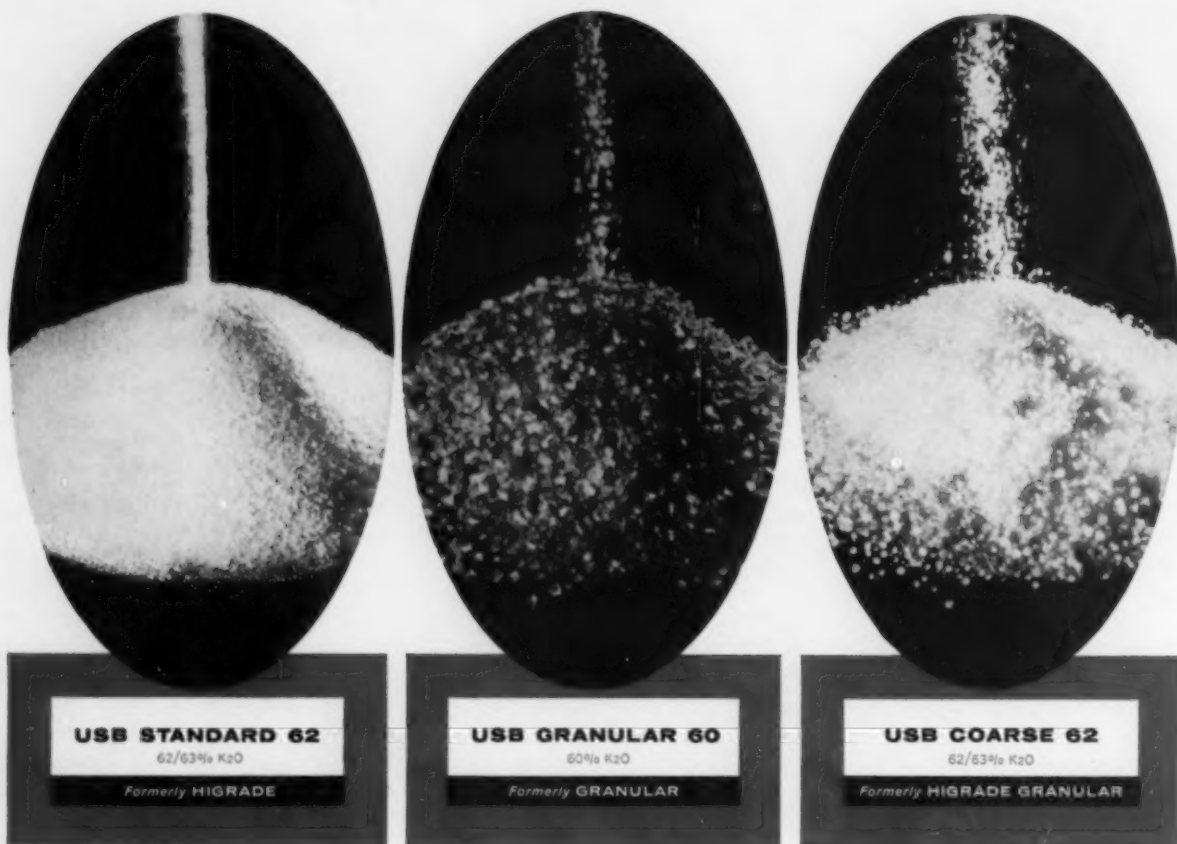


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"Jeb" Stewart, NPFI board chairman

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THE COVER STORY

It's appropriate that we feature on the cover for our June NPFI meeting number the chairman of the NPFI Board of Directors. Jefferson ("Jeb") D. Stewart of Louisville, Ky., hardly looks "old enough" to be president of a large company like Federal Chemical Company. But go way back to 1936 and you'll find he was holding down mighty prominent positions with the same company even then. Now comes the real surprise. He was born in 1915—which makes him 45 years old, if our arithmetic is right.



Allen C. Pogue
Plant Manager
Tennessee Farmers Cooperative
Laverne, Tennessee

W. H. "Mitch" Mitchell
Manager, Plant Food Division
Tennessee Farmers Cooperative
Laverne, Tennessee

Tennessee Farmers Cooperative supplies 40 counties from this modern plant at Laverne, Tenn. Read below how this leading fertilizer manufacturer holds down corrosion with SPENSOL GREEN®.

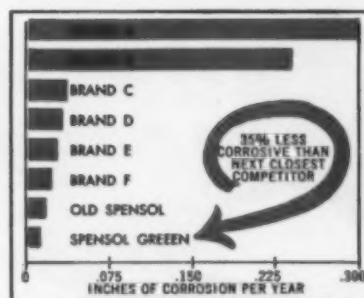
Major Tennessee Plant Food Supplier Relies On SPENSOL GREEN Solutions

One of Tennessee's leading fertilizer manufacturers, Tennessee Farmers Cooperative operates three plants, all about 200 miles apart. TFC Plant No. 1 (above), which serves a large area in central Tennessee, has been expanded from its original 20,000-ton capacity to 50,000 tons.

The first plant in the state to use ammonium nitrate-urea solutions, the TFC operation at Laverne has complete facilities for manufacturing, bagging, storing and shipping mixed fertilizers and superphosphate. Like many progressive fertilizer producers, TFC relies on SPENSOL GREEN non-corrosive Ammoniating Solutions.

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LETTERS

BULK HANDLING & STORAGE

Kansas City, Mo.
You did a very good job on your article in the March issue entitled, "What's Happening in Bulk Handling and Storage of Fertilizers?" It represented good factual treatment of a timely subject.

Our company would like to purchase 1,000 copies of this article, if you are willing to reprint it . . .

Sincerely yours,
R. L. BALSER
Product & Marketing Manager
Solid Fertilizer
SPENCER CHEMICAL CO.

One thousand reprints will be on their way soon.—EDITOR.

Lima, Ohio
Congratulations on the excellent stories you have on bulk handling in FARM CHEMICALS magazine. I have called this to the attention of a number of people who I know will be interested in the information you have put together. We all rely on such information to keep us abreast of new things which you have illustrated so well in these articles.

I was particularly interested in your statement that "the liquid industry spurs

bulk sales." There is no question in my mind but what this is far more true than most people ever dreamed. The liquid industry has moved forward very rapidly, and one of the biggest reasons for this has been the point of convenience of application . . .

H. H. TUCKER
Agricultural Service Director
SOHIO CHEMICAL CO.

MORE ON PEST CONTROL SCHOOL

Richmond, Va.
I am writing in reference to an article in the March issue of FARM CHEMICALS, page 10, under the heading of "What's Doing in the Industry," paragraph 8, concerning the first school for training in pest control in Chicago known as the Elston School for Pest Control. I would like information pertaining to length of time required for this course, cost, etc. Any information you can give me on this will be greatly appreciated.

Very truly yours,
R. L. BRYANT, JR.
Insecticide Dept.
T. W. WOOD & SONS

For detailed information, we'd suggest your writing to Elston School of

Pest Control, 4674 Elston Ave., Chicago. Dr. Robert E. Berns is president, and Dr. J. J. Davis is director. Both correspondence and residence instruction is offered.—Ed.

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Yours truly,
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Marianna, Florida
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Three of us who work with the Marianna Research Center, Southern Forest Experiment Station, Forest Service, USDA, would like very much to have copies for our individual files. If there are any charges, please let us know and I will remit at once.

Sincerely yours,
ROBERT L. SCHEER

Copies of the Dictionary are available at 1.50 each. Quantity prices on request.—Ed.

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Rate of Spread—60 to 350 lbs. per acre
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Capacity—2 tons
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Rate of Spread—60 to 350 lbs. per acre
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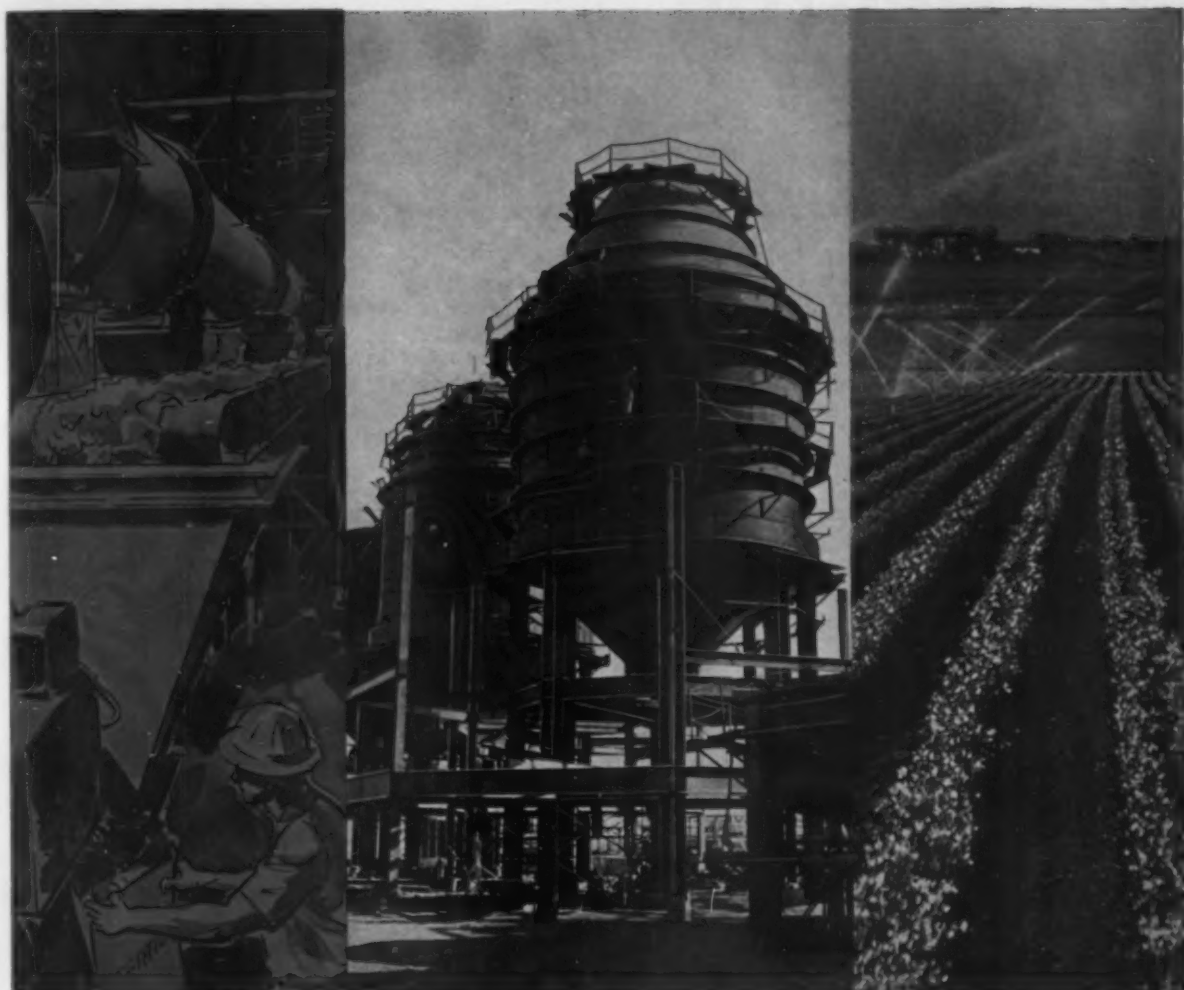
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WASHINGTON VIEWPOINT

By GEORGE PETER

F
C

- Switches from earlier prospects indicate stepped-up demand for farm chemicals.
- Frontier administrators are dead-set against long-term land retirement schemes.

Farm demand for chemicals of all kinds—particularly fertilizer—will be stepped up over the months ahead and into next year. Several switches from earlier prospects support this viewpoint at mid-year.

Switch No. 1. Production acres cutback from the feed grains program of over 10 million acres will be more than offset by a number of factors. 10 to 15 million acres out of production is a lot of acres, but even without compensating factors would still be about a 3 per cent drop in the bucket of planting intentions of 330 million acres.

Against this, the White House and USDA will continue calling for MORE production of crops that are in demand. This means edible fats and oils and storable protein type production. Soybean growers alone upped planting intentions by 2.2 million acres before an increase in price of support of 45 cents a bushel was announced. Unofficially, some official guessers expect this to increase by at least another million acres since the support increase. Food for Peace Administrator McGovern was banking on the support increase to bring out additional production from about 4 million acres.

New Frontier administrators are dead set against whole-farm Soil Bank retirement or any other long-term land retirement schemes and they will hold the whip hand here. This is what is in back of behind-the-scenes notice that any legislation interfering with plans for ever-increasing food production will run into a White House veto.

Other increased crop production is considered certain in potato and fruit and vegetable growing areas. New sugar growers are expected to enter the picture via a new Sugar Act granting increased allotments for stepping up domestic sugar production. Allotment increase would have to be sizeable, particularly in beet sugar areas, to make it worthwhile for processors to build additional plants.

Where more chemical business is also coming from is in increased yields on land where production has been below average as a result of minimum fertilizer application.

Reliable information through spot check field reports reaching USDA indicate that additional income of nearly \$2 billion dollars available to farmers over the months ahead is making it possible for farmers to invest more in fertilizer as a profit-making practice.

Rough educated estimates are that higher income from farming should result in an increase in the use of fertilizer and lime of about \$100-150 millions more than last year at a minimum.

You can also look for cash grain farmers to make gains under the new feed grain program by signing up for the minimum 20 per cent of corn or milo land cutback and then shooting for higher yields. The law only requires that yields be held to the average for a particular cutback agreement. Since most growers use less fertilizer than is profitable, they can pull yields up to the average and still participate in the program.

But grain-livestock producers can also profit in the feed grain program. They can, as reports are showing, sign up in the feed grain program and bring yields up to the average and turn the crop over to the Government at the \$1.20 bushel loan level. Then buy the grain they need for livestock at about \$1.00 a bushel bushel. It's legal.

Switch No. 2 in prospects. USDA economists at mid-year are sure the \$1.5 to \$2.0 billion pickup in farm income aimed for as a goal back in January is in the bag. Farm income efforts earlier were concerned over whether last year's level could be maintained.

Bird's-eye 1962 prospects. Almost sure-fire is Congressional approval of a two if not three-year extension of the Food for Peace Program, alternately known as P.L. 480. This would assure annual food and fiber exports of \$2.5 billion a year for the next two years. Farm production would have to be kept up at a level sufficient to supply the program.



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WHAT'S DOING IN THE INDUSTRY

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C

Allied Chemical's General Chemical Div. has on stream a new plant for "Urox" and "Urab" herbicides at the Baltimore, Md., Works. Permitting a 400 per cent increase in production capacity, the plant also includes a modern warehouse.

Construction of a 39-mile railroad spur to the projected Texas Gulf Sulphur potash plant near Moab, Utah, will begin about August 1, the Denver and Rio Grande Western Railroad Co. has announced. The \$30 million potash facility is expected to go into operation in the fall of 1962, and the spur probably will be completed in August, 1962.

Ordinary sugar is a very effective nematocide, according to a recent report from USDA's Horticultural Field Laboratory at Orlando, Fla. There's a catch in the discovery, though: It's expensive—several tons of sugar per acre are needed to wipe out all nematodes. But researchers say the treatment can be useful in greenhouses and gardens.

One of the members of a nine-man team of American automatic control experts who visited Japan last month was Dr. Joel Heugen, a technologist in the systems engineering section of Monsanto Chemical Co's Research and Engineering Div. The team, composed of scientists from American universities and industries, toured Japan May 9 through May 30 at the invitation of the Japanese National Committee on Automatic Control, a part of the Science Council of Japan.

USDA's research report on MH-30 "substantially supports the contention of the chemical's manufacturer—Naugatuck Chemical Div., United States Rubber Co.—that proper use of MH-30 will result in tobacco as good as hand-suckered tobacco," according to Dr. H. D. Tate, Naugatuck Chemical's manager of agricultural chemical research and development. "While the report says the chemical may cause slight chemical and physical changes in a tobacco leaf, the major point emerging from this study is that MH-30 does not lower tobacco quality when it is properly applied," Dr. Tate said.

A plastic bottle, said to be strong enough to stand up to the high pressure needed for horticultural and agricultural spraying, has been developed by a British firm. There's a metal plunger fitted to the top of the two-and-a-half gallon container. The operator pumps until he feels the pressure build inside the bottle and then he releases a control tap to allow the liquid to spray through a detachable 20-inch nickel-plated, brass-angled lance.

The Knight's Cross of the Legion of Honor has been awarded to Norbert B. Van Buren, general manager of eastern hemisphere operations for California Chemical Co., for his contributions to industry and agriculture in France and his efforts to promote Franco-American friendship and cooperation.

Some months ago an article was published by the Milwaukee (of all places) Journal titled "Milorganite Moves from Profit to Loss." This led some people to believe that Milorganite would be removed from the market, and there were predictions that "makers of Milorganite would be out of business by mid-year." The Sewerage Commission of Milwaukee has made a strong statement to the contrary: It "unequivocally states that it has no intention of removing Milorganite from the market now or in the future. We will continue to manufacture Milorganite as long as there is a City of Milwaukee."

International Fertilizer Development Corp., an affiliate of International Ore & Fertilizer Corp., reports appointment of Christopher J. Pratt as vice president in charge of operations. A chemical engineer, he is a co-author with Dr. Vincent Sauchelli of "Chemistry and Technology of Fertilizers."

Sales of Hercules Powder Co.'s agricultural chemicals in Florida, Georgia, Alabama and the major portion of Tennessee will be supervised by Norman R. Downey, formerly senior technical representative for agricultural chemicals.

Plans for new and expanded fertilizer chemical production facilities in the U. S. call for construction projects costing more than \$178 million during 1960 and 1961, the Manufacturing Chemists' Association says. Florida, with a total of \$108.92 million, is receiving the greatest share of this construction.

More protein—more meat. High-protein grains pay big dividends in faster-growing, fatter cattle and sheep.



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STAFFING your marketing organization

By LOUIS B. BACKER*

PART I

What kind of a manager are you?



IF a manager wishes to have a *specific job function* performed adequately, he must 1) know the job completely in order to teach it to the person intended for its performance, 2) get someone who does know the job and teach it, or 3) hire an employee already trained in that job.

With this basic premise in mind, the job of selection and training employees becomes infinitely more clear.

First of all, we ought to define the manager's job. Isn't it to *accomplish some desired results through human effort*?

Now we must determine what a manager has on hand with which to perform his job.

FOUR FUNCTIONS TO PERFORM

Once he's clearly seen what his objective is and he knows where he wants to go, he then has four functions to perform . . . 1) planning, 2) organizing, 3) motivating and 4) control.

How does he go about this? What's involved? Well, the manager must see an objective. He's got to find out how he's going to attain that objective. When he gets around to organizing, this again is a creative effort and he's got to determine *who* is going to carry out the various parts of this plan.

He's got to organize around the work and not around the people that he has.

Now once he's decided all this, he's

got to bring the message down to the people who are going to do the job. He's got to get over to them what their particular job is and this we call *motivating*. A formal management definition might be the securing of willful and intelligent cooperation and action. That's really loaded. The securing of willful and intelligent cooperation and action. All of those words are important. Action means very little unless it's willful and unless it's intelligent. If it isn't intelligent it is not the type of action that we want. It will never get us to our objective.

Now one of the things that we know about motivation is that in order to get to this action we must always have two prerequisites—one, we must secure understanding (understanding of what is to be done) and then we have to get acceptance of one form or another. We'll talk about that more in depth later.

Lastly, the manager has one important function to perform and that is *control*. Here he has to set up some standards, so that this operation will go according to plan. Nothing is going to go awry. You've got to get hold of it. You've got to keep on top of it all the way.

THE MANAGER'S TOOLS

All right, the manager's job then is planning, organizing, motivation and control. What has he got to do this with? *What are the tools?* The carpenter has his tools, the electrician has his

tools—what are the tools of a manager?

The tools of a manager are simple and can be learned by anyone. They are two in number.

First, and most importantly, the manager has to be able to *think clearly*. Anytime I use the word think from now on, please understand that I am inferring that it is *clear* thinking, it's *straight* thinking, it's *logical* thinking. This is not easy.

I don't know how many of you folks are familiar with a gentleman by the name of Bill Riley. He's written about fourteen books on the subject and devoted most of his life to the subject of clear thinking. He does a very fine job in his book, "The Twelve Rules to Straight Thinking."

In this book Bill indicates that in the process of clear thinking, you've got to start with an *investigative* and an *open mind*. You've got to look around. You've got to select a lot of facts—get all the facts that you possibly can. In this area you've got a big job in separating out facts from opinions.

When you do this, after you've worked on it for a while, you come down to a point where pretty soon these facts seem to fit together and now you can begin to state the problem you're working on.

Only now, after you've done a great deal of spade work, can you state the problem for the first time.

THE "IDEATION" PHASE

Once you've been able to state the problem, you can go on and get into, as Alex Osborn calls it, the "ideation phase." You begin to think up various possible solutions.

Then you go into the evaluation stage, where you begin to weigh one solution against the other. You make up a balance sheet, get all the pluses and minuses. Finally, after this process, one will stand out above the other. Select it, implement it and you're off. Now this is the process of logical thinking, straight thinking. It's not easy.

Most people would rather not go through all these steps. Most people use what we call natural thinking. What do we mean by natural thinking? You don't even actually get the problem. You become aware that you have a problem and then all of a sudden you jump right into a solution and put it into operation.

This is what we call natural thinking. Once you've committed yourself to a solution of this kind, the damage is done. It becomes a face-saving operation from then on. You've got to protect what you've said, and even though you know you're wrong you defend what you've said.

How many times have you seen this

*Don Scott Associates

happen? A meeting is going on. You've been sitting there for a couple of hours. They've been gassing a bit about the election, you didn't agree with them, so you just sat there and didn't pay too much attention to it, finally your mind wandered off a little and just about this time you're beginning to think, "Oh, gee, remember last night what fun I was having with Junior? We were playing in the living room and I got up to chase him and I hit my shin on that coffee table. Boy, that garter is right on it right now!"

Then somebody says, "Jim what do you think? Where are you . . . where are you?"

Well, you're faced with a dilemma. You're faced with doing one or two things. You can say, "What was that?"—and very few of us will do it. Or you might say, "Well, it's too red."

Now the damage is done! Now you've got to defend it, and you'll do it, too, believe me!

So this is natural thinking. The other tool of a manager is communication. Communications really might be looked upon as the medium by which all plans and other creative effort are transferred into action.

There are many things which prevent two-way communications, however.

Emotions, for example. You might call somebody in to talk to him and say, "Oh boy, where did you get that red tie?"

What happens to your relationship? He becomes antagonistic. You've insulted him!

That tie may have been given to him by his wife. He thinks it's the best tie in his whole collection. Emotion then plays a big part in communication. It upsets the relationship between the pitcher and catcher.

Tension is another factor that prevents good communication. Those who listen to the radio commercials will recognize it immediately . . .

"What's the cause of headache? TENSION!"

What is tension? Where does it come from? Mostly, it comes from lack of time. We're trying to do things and we're trying to work against time.

Funny thing about time. Most managers don't bother to analyze where it goes!

In the average day, your time goes something like this: You have, first of all, a certain amount of *routine work* which you must perform. You have to read the mail, answer the letters, answer the phone—and you have to go out and do a selling job now and then. But this is only part of your effort.

Then you spend another portion of time on that which we call *specials*. This

is not routine work and it doesn't have to be done immediately. You have some time in which to accomplish it—perhaps several months. It could be that you have to select a new site for a warehouse. Or you have to write a report on some aspect of selling down in the southwest.

The third part of your effort is spent on *work*. Too often we find managers spending a major part of their time putting out fires. This is where the tension comes into play.

Then, lastly, there is that effort that goes into creative work, such as planning and organizing.

And this brings us back to communications. In any communication *four understandings* are involved:

First, there is what I *want* to say to you. Second, there is what I *actually* say to you that must be considered. These may or may not be the same! This depends upon my ability to express my thoughts clearly. The third consideration is what you *think* I said. This may be the same as what I actually said—or it may be different. Fourth, there's what you *want to hear*. This frequently affects the understanding.

Now when it really boils down to bed-

rock, the important thing is *what you think I said*.

I can remember some time back, I was putting on a program for a group of young engineers—fellows right out of college. I arranged to get speakers from all over the company for which they were working. These speakers were engineers who had performed an outstanding job in various areas of activity.

One, for example, was an outstanding project engineer and I had him come in and talk on the best methods of doing project work—how to do it in the most economical manner.

Then I got a man from the development group, then a design engineer and finally a product engineer.

When we were done with this course, we had an evaluation. Now if I had to pick the fellow who did the *poorest* job, it was the one from the development group.

But who do you think our young engineers picked as the *best* speaker? None other than the development boy. Somehow or other he got across to them. He told them what they wanted to hear—*how* I'll never know—but this is a sterling example of what *they think* you said that counts.

PART II

Training and Development



NOW let's get down to the real subject at hand.

I want to place the subject of development of people in its proper locale. We've talked about the four functions of a manager. The one that we're interested in particularly here now is motivation. A manager has his people to do the job and to accomplish the company objectives.

Motivation is the securing of willful and intelligent cooperation and action.

Basically I think we can say that all motivation is accomplished through some communication between the manager who is responsible for getting the job done and the person who's going to do the job. So let's explore for a moment some of the techniques.

We motivate people through leadership. Leadership is that quality of a manager which enables him to recognize, select and use the technique of motivation that is appropriate to that particular situation. A manager has to be able to recognize the situation and to

apply the proper technique of motivation in order to get the job done.

We also motivate people through good human relations. Now good human relations is simply the medium for bringing about the maximum satisfaction of the economic, social and psychological wants of individuals interacting with a particular organization or company.

THE BASIC NEEDS

Basically, we all have to work for money so we have to get some kind of reward for this. We're looking for a satisfaction of an economic need.

We all like to stand out on occasions. We all have an ego we have to satisfy so there's a psychological want or need which must be satisfied and thirdly, there's a feeling that we want to belong. Thus we have a social need or want which must be satisfied.

So, if a company is practicing good human relations, they're simply trying in every way possible to satisfy all these

STAFFING your marketing organization

(Continued)

three basic needs of the individuals working with the company.

Now lastly, we get down to our subject at hand and that is on the third method of motivating people which is through the development and training of individuals.

We have found that when you get involved in the improvement of people there are *three essentials* on the part of the individual.

First, there's got to be a desire on his part to improve. He must want to improve. You can't do much for an individual who doesn't want to get any better.

Secondly, he's got to acquire some knowledge. This is a knowledge of the basics or the fundamentals of the trade. This is where he learns **WHAT** has to be done under various different circumstances. In this area you can help him, because people learn from people. People learn by reading books, by listening to lectures, by discussing amongst themselves various different basics and fundamentals.

Third, he's got to acquire some experience which is nothing more or less than finding out how to apply the knowledge that he's learned.

Now, how do we go about doing this? Well first of all, I think I'd like to explore a little bit further the subject of development versus training here.

The term development has a connotation of education, if you will, and education implies a leading out of something already inside.

All development is really self-development, when you come right down to it, and self-development is tied in with desire.

Now training, on the other hand, has a little different meaning to most people. It's tied in more with instruction rather than development. It's used in connection with instruction where jobs will be repetitive. It should always be used when you're going to start any new job.

WHY TRAIN & DEVELOP?

Training and development are something that must go on always. You never stop. What are your reasons for it?

First of all, your main reason for training and developing people is that you're going to improve the efficiency of the individual. You'll improve his performance and you'll improve his productivity. It's certainly going to help us accomplish our objective, there's no question about that, and of course we

ourselves as managers cannot expect to progress or to be promoted or to move on to another job unless we've got another man standing behind us to take our job.

If we want to develop individuals there's only one logical and economical way to do it—and that is according to *need*. Don't use a shotgun approach; develop them according to what they need. How do you find out what they need?

You have to analyze their successes and their failures and you have to come up with what they need from this.

How do you find out what their successes and failures are? It requires a measuring process, an appraisal of performance.

Most people are afraid of appraisals. Sure they are—and why? Because most appraisals that we see today are meaningless. They're not based on standards.

If you're going to measure anything, you've got to have a standard against which you can compare. If you're going to measure performance, then you have to have a standard against which you can measure this performance. It has to be pre-set and understood completely between the man and his boss. After the time has elapsed for the performance, it's comparatively simple to determine whether he did or did not accomplish this result or that.

How do we go about setting these standards then? The basis for your standards is in a sound job description. This you *must* have as a starter.

DESCRIBE THE JOB

Well, we've got a starting point. The first thing we must have is a job description. Now what is a job description? A job description spells out beyond any question of doubt the duties, responsibilities and authority of the individual.

How can you obtain this? You can go out and hire an analyst to write it. This is one way. You can have the supervisor write it. He certainly knows what the job is. There's certainly no question about that. How else can you get it?

Let's assume that we're talking about a company that is already in business. How about having the employee write his own job description? We have learned that in order to get good communication and to insure understanding we must have two-way communication.

Previously we said that the only worthwhile development is self-development and it must start with a desire on the part of the individual. Here's how it works. If you are working for me, I start by saying, "Jim I want you to think about your job for a while. I want you

to sit down and write what you think your job is. I want you to spell it out in as much detail as you possibly can in the area of duties, responsibilities and authority. Then come back and we'll sit down and we'll talk it over."

Later we discuss it, and perhaps make some changes. Still later we finalize the job description.

What chances do you think we have of having good understanding doing it this way? Excellent. I don't believe you could ask for any better relationship between a boss and his subordinate when the job description is worked out this way.

ESTABLISH KEY GOALS

So now we have the job description. Our next problem then is to establish a framework for performance. This we call key goals or key results expected. Now I say, "Jim, we've got a fine job description. I want you to take another look at your job and put down what you plan to accomplish over the next six months in terms of key results that you're going to accomplish." So you go back and because you know the job you set some meaningful objectives. When we talk it over again I find out what you expect to do.

There are many advantages in establishing the job description and key goals in this way. For one thing, if you are the supervisor, you're sure after two sessions like these just described that the employee understands what the objectives are.

Secondly, you find out as a manager a lot of things that you didn't know were going on. In many cases you get a very good picture of what the employee thinks of the job.

You may find that there are a few points that you don't know. You may find out that duplication of effort is taking place.

Now after the period of time for these results to be accomplished has elapsed, you come to the appraisal period. The task becomes easy, because you, as manager, have in your hands a series of results which your man said he's going to accomplish. Did he do it? It's easy to find out whether he did, and you're on safe ground.

For the first time, you can perform an objective appraisal, because all you do is to compare performance against pre-set goals. You simply record how well or how much the appraisee performed.

The next step in the manager's job becomes one of analyzing the appraisal—analyzing the successes and the failures. Here of course, there's a lot of judgment involved. Knowing the person as well as possible will help the manager a great deal. (Continued on page 50)

NEW

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For the first time, the protection of polyethylene and the strength of rugged multiwall have been successfully combined to give **complete** moisture protection in the packaging and shipping of hygroscopic and other "difficult-to-package" products... plus, elimination of many corrosion and contamination problems. The Raymond flexible MPS Multiwall sack can cut your costs up to 50% or more by replacing costlier, space-consuming fibre drums and other rigid-type containers. This process utilizes a **seamless** polyethylene tube integrated with the multiwall... then sewn and heat-sealed above the sewline to give **perfect sealing**... keeps product quality constant from packing through final use.

The Raymond MPS (Multiwall Perfect Seal) shipping sack has already met the critical requirements of storing and shipping such diverse products as milk replacers, refractory cements, plastic res-

ins, anhydrous sodium bisulphite, and others. Potential applications are seen for **any product in any field** that requires protection from or retention of moisture. Let Raymond's experienced packaging engineers work with you to put your

"difficult-to-package" products in economical, rugged multiwall... you may well realize substantial savings in storage, freight costs, and ease of handling, as well as drastic reductions in original package costs.

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MERCHANDISING AIDS PROMOTION



Why Control Stock?

By F. E. HARTZLER

THERE are many reasons for controlling inventory—such as less shop wear on merchandise, less space required for the same amount of sales, or less help to maintain the smaller stock of goods.

These are good reasons; however, the two big reasons have to do with money. Stock control will free more cash for either credit or cash position, and it will make possible a much larger return on your investment.

BUYING FOR THE YEAR

To illustrate just what we mean by return on investment, let's take a problem with some easy figures. Suppose you have just bought enough merchandise to last for one full year's sales and that this merchandise, costing \$60.00, will sell for \$100.00. Let's set these figures down together with those showing margin and operating expense:

Sales	\$100.00
Cost of goods	60.00
Margin	40.00
Operating expense	34.00
Profit	<u>\$ 6.00</u>

These figures are far from accurate, but they are easy to work with as an example. So using them to illustrate our point, the profit on the investment in inventory is the ratio that we are after here.

To see it more clearly let's diagram it. Remember we start with \$60.00 cost at the beginning of the year, and, if we are right, we run out at the end of the year. A diagram of such investment over the year's time would look like Figure 1, below left.

In short, we start with \$60.00 cost and end up with nothing, so our average investment for the year would be \$30.00. Now if we divide the profit by the average investment in inventory, we have $\frac{6}{30}$, or a 20 per cent return on the investment in inventory for the year. This is too low.

BUYING QUARTERLY

Now let us take the same figures as we had before, but instead of buying a year's supply at one time, we will buy only a fourth of the supply, or \$25.00 worth each time. We will still have our sales of \$100.00 at the end of the year,

This fifth article in our series, "What the Manufacturer Can Do for the Dealer" is the first of four articles on stock control. In future issues various control systems will be discussed.

A method of putting a business under control and how to maintain a system for best possible results will round out the series by Author Hartzler.

A method of putting a business under control and how to maintain a system for best possible results will round out the series by Author Hartzler.

but we will be repeating the \$25.00 pattern four times. The figures would now look like this:

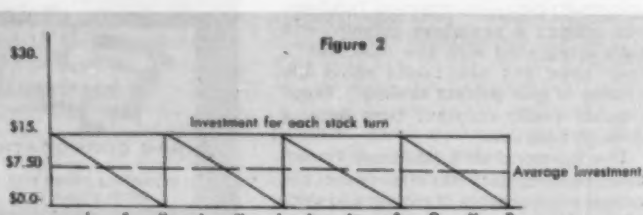
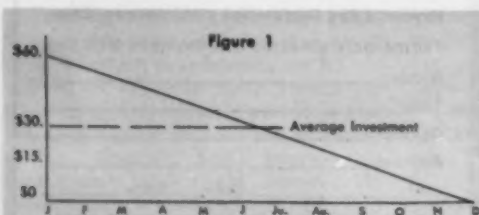
Sales	\$25.00
Cost of goods	15.00
Margin	10.00
Operating expense	8.50
Profit	<u>\$ 1.50</u>

No, you have not lost any money. Although you only made a \$1.50 profit, you will make it four times during the year. You will have the same \$6.00 profit at the end of the year and all other costs will remain the same.

However, there is one big difference that often gets lost in the rush—the ratio of profit to investment in inventory. To diagram this ratio, we have not one line illustrating our progress, but four. (See figure 2.)

INVESTMENT CHANGES

Please observe what has happened. We have the same sales for the year, the same purchases, and the same expenses. In this respect we have made no changes. But our average investment in inventory this year is only \$7.50. Let me explain this again. We bought \$15.00 worth four times and ran out each time. So, as the diagram, shows, our average investment was only \$7.50. The return on our investment in inventory is now the same \$6.00 profit but, this time, divided by \$7.50—an 80%



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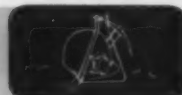
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PROMOTION

return on our investment. This is a decided increase in efficient use of capital.

To illustrate an extreme case, let us take some figures from a supermarket. The cost of goods in a supermarket is roughly 80 per cent, net profit about 2 per cent. However, the ordinary supermarket turns its merchandise about 28 times a year. Just to keep the mathematics easy, let's use 25 turns a year. Thus, for one of the turn periods the figures would look like this:

Yearly Figures	
Sales	\$100.00
Cost of goods	80.00
Margin	20.00
Operating expense	18.00
Profit	\$ 2.00
One Turn	
Sales	\$4.00
Cost of goods	3.20
Margin80
Op. expense72
Profit	\$.08

From these figures we can learn that the average investment in inventory is

WHY CONTROL STOCK (Continued)

the \$3.20 down to nothing, or \$1.60; the profit is \$2.00; the ratio of profit to investment in inventory is 1.25 to 1, or a return of 125% on the investment in inventory.

Let me point out that this tremendous return is achieved by having what the customer wants at the time the customer wants it. It means that there is no stock sitting on the shelves for month after month not earning a cent, but on the other hand you are not out of the stock that the customer does want.

This is not magic, nor is it just playing with figures. The ratio is an old one, although it is frequently overlooked among independent merchants.

It must be emphasized that there are lines of merchandise that cannot be turned often. Gifts, wall paper, paint and expensive watches are four that come to mind immediately.

GETTING ONE MORE TURN

Frequently, however, there are ways of getting one more turn, and that one more turn can mean a lot in efficiency. A large number of stores in small towns are apt to be out of merchandise that

would sell rapidly, while they do have some red-hot special that they bought four years ago still on the shelf. The store in a small town must diversify its lines and reduce its inventory in order to make more money. To do this requires some sort of system. It cannot be done without one. Yet once a stock control system is established, more cash is freed for use and the return on investment is much greater.

Although this has been presented as an aid for dealers, manufacturers can gain as much or more from such a system as the retailer.

By checking quickly with retailers in their dealer chain they can learn rapidly which chemicals are going well and which ones are just filling up the shelves and will not be reordered.

Stock control and purchasing systems have been in existence for at least thirty years. But for good buying and efficient operation you must discover your own needs and put in your own system. ☆

In the next article we will discuss various systems that might be used.

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Hopper Dimensions 60" x 84"
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Fans Angled Twin 19 in. Dia.
Wheel Bearing Sealed Timkin Bearing
Capacity 2½ Ton
With Body Extension-19 in. 4 Ton
Spread Pattern Approx. 45 Ft.
Spread Capacity Pr. Hr. 30-60 Acres
Field Speeds
6 M.P.H. 30 Acres Pr. Hr.
12 M.P.H. 60 Acres Pr. Hr.
18 M.P.H. 90 Acres Pr. Hr.
Highway Speeds up to 60 M.P.H.

INTEROFFICE CORRESPONDENCE

TO: all department heads

FROM: L. W. Gopp, vice president

We've just closed the books on another fine fiscal year. This last twelve-month period has been one of our most successful to date and we've been unusually fortunate in signing additional new contracts.

More than ever I feel that the continued growth of our business reflects confidence in our people and in our products and services by an imposing list of customers. I feel, also, it is our individual responsibility -- at every level of the corporation -- to show, in an active way, our appreciation for this business. I encourage you to continue to look for new and improved ways to extend still further the IMC concept of total service.



Len Gopp

AGRICULTURAL CHEMICALS DIVISION
INTERNATIONAL MINERALS & CHEMICAL CORPORATION



How Union-Camp's 5-Star Plan saved multiwall bag user over \$130,000 a year

Making things the same can sometimes make a whale of a difference. Particularly in a multiwall bagging operation. The Smith-Douglass Company, Inc., of Norfolk, Virginia proved it recently when they put Union-Camp's 5-Star Plan into action. The difference—in annual packaging savings—came to over \$130,000 a year!

Standardize = Economize

Initial 5-Star Plan surveys at Smith-Douglass' six plants revealed that *standardization* held the key to major cost reductions. Three plants used sewn open-mouth multiwall bags. One used sewn valve bags. The remaining two plants used both types of bags.

Union-Camp's multiwall specialists showed that \$30,000 a year could be saved by converting all six plants to sewn open-mouth bags and using open-mouth bag filling machines.



5-Star Plan in action. Plant surveys made by Union-Camp multiwall specialists paved the way for the major packaging savings described here.

That was only the beginning. By carrying the change-over one step further, and standardizing on *size* and *construction* of multiwall bags, the company would save another \$22,000 a year.

1 Design Replaces 160

Next, Union-Camp's survey team analyzed the company's existing bag designs. They found there were about 160 designs being used. Here, again, standardization was recommended.

By creating one basic design, eliminating an expensive yellow outer sheet, and using the same printing copy for all bags, the company netted additional economies of \$84,000 a year.

\$30,000 plus \$20,000 plus \$84,000.
Total annual packaging savings—\$134,000.



\$30,000 a year savings resulted from converting to sewn open-mouth multiwalls in company's six plants.

How Much Could You Save?

Hundreds of companies—large and small—reduce their multiwall packaging costs by taking advantage of Union-Camp's 5-Star Plan. This comprehensive service is free. It covers

bag design, bag construction, specifications control, packaging machinery and a survey of your materials handling operation. An improvement in any one of these areas conceivably could result in substantial economies for you.

See your local Union-Camp man for complete details.



This basic bag design, now used for all Smith-Douglass brands, reduced company's multiwall costs by \$84,000.

FREE 16-PAGE BOOKLET

Write Dept. M-4 today for a free copy of Union-Camp's new 5-Star Plan booklet. It describes many case histories showing how packers like yourself have achieved greater efficiency and economy in their multiwall packaging operations.

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MULTI WALL BAGS

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Producing granular

POTASSIUM METAPHOSPHATE

at Scottish Agricultural Industries

INTRODUCTION

Potassium metaphosphate ($(KPO_3)_n$, or potassium Kurrol's salt, is a water-insoluble condensed phosphate. However, it is soluble in very dilute solutions containing cations other than potassium. Many of the uses for potassium metaphosphate are based on these 'pseudo-solutions' which characteristically possess two important properties.

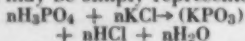
Firstly, the dissolved metaphosphate groups form complexes with polyvalent cations such as calcium and magnesium and, secondly, the potassium metaphosphate radically modifies the viscosities

of solutions and slurries in which it is dissolved. By virtue of these properties potassium metaphosphate has been used in water softening, in the detergent industry, in mineral separation, etc.

Another application for potassium metaphosphate is as an intermediate in the manufacture of other phosphatic minerals, when the main advantage lies in the fact that relatively cheap raw materials can be used. Also, because of its very high plant food content (100% in the pure compound), potassium metaphosphate is useful as an ingredient of concentrated fertilizers.

Scottish Agricultural Industries Limited have developed and patented a process (Brit. Pat. No. 832,011) for the manufacture of granular potassium metaphosphate from phosphoric acid and potassium chloride at relatively low temperatures.

In the process the reactants are added to a circulating bed of hot preformed product particles to form a relatively thin skin on each particle. The reaction which may be simply represented as



involves the elimination of water and the evolution of hydrogen chloride. The operating conditions are such as to enhance the reaction which is completed in a short time at temperatures as low as 450° C. A special reactor has been developed to carry out this process which, at the same time, allows the hydrogen chloride to be kept apart from the combustion gases and recovered as a useful coproduct.

The product is obtained in the form of hard, easily handled granules. It is a feature of this process that impure reactants can be used if a technical grade

product is acceptable, e.g. for use as a fertilizer material.

POTASSIUM METAPHOSPHATE AS A FERTILIZER

Potassium metaphosphate has been of academic interest as a fertilizer material for at least 40 years. Its advantages include good storage properties and high concentration (60% P_2O_5 , 40% K_2O). It is nonhygroscopic and water-insoluble, therefore it is not prone to caking, and elaborate packaging precautions are not necessary to prevent moisture pick-up and bag rot.

The freight and haulage charges for potassium metaphosphate, per plant food unit, are at a minimum because it is the most concentrated fertilizer of proven plant food value. It is relatively noncorrosive.

The manufacturing costs of potassium metaphosphate are significantly higher than those of other water-insoluble phosphate fertilizers, but results of world-wide pot and field trials* show that its fertilizer value is much greater than that of other water-insoluble phosphates, and in fact it is similar to that

of the water-soluble phosphates. In the main the manufacture of fertilizer grade potassium metaphosphate has been based on the reaction of potassium chloride with phosphoric acid. Its processing costs are higher than those usually associated with conventional fertilizer, but these costs are offset by savings derived from the high concentration of the product; these savings occur in distribution, handling, packaging, etc.

In the past, full-scale development of potassium metaphosphate as a fertilizer has been impeded mainly by shortcomings on the manufacturing side. Most of the processes tried have suffered from one or more of the following disadvantages:

a) high temperatures of around 900° C. had to be used;

b) the reactants at such temperatures were very corrosive;

c) relatively pure phosphoric acid or elemental phosphorus was used;

d) the form of the product was inconvenient; it usually was a solidified melt.

The S.A.I. process of manufacturing potassium metaphosphate overcomes these disadvantages. It is particularly suited for the production of a technical grade of granular potassium metaphosphate from impure reactants such as wet process phosphoric acid and muriate of potash.

A typical product contains 57% P_2O_5 and 37% K_2O . Its pH is about 6.0. It is for all practical purposes chloride-free and is substantially potassium metaphosphate. The storage behaviour of the granules is excellent and they show none of the caking tendencies to which conventional fertilizer materials are prone. The $K_2O:P_2O_5$ ratio can be increased by the inclusion of additional potash salts in the manufacturing stage.

FERTILIZER VALUE OF POTASSIUM METAPHOSPHATE

In the soil potassium metaphosphate has a phosphate availability similar to that of water-soluble orthophosphates. This is because it is soluble in dilute solutions of most salts (other than potassium salts) and accordingly dissolves in soil solution. Although initially the rate of phosphate availability of potassium metaphosphate alone is slightly less than that of a water-soluble phosphate, over a complete growing season the total available phosphate is usually the same. The rate of availability may be controlled, for example, by particle size variation or by blending with other fertilizer materials.

The mechanism of solution of potassium metaphosphate by dilute salt solutions is believed to be one of cation exchange. Hence the potash availability, in rate and quantity, is generally similar to that from soluble potassium salts. In light soils granular potassium meta-

This article is published through the courtesy of Scottish Agricultural Industries Limited, 39 Palmerston Place, Edinburgh 12, Scotland.

*These trials are surveyed in Company Report RD/CR/33x.

Fertilizers won't cake—flow freely in the field

Many a farmer has been cursed by the serious caking problem which so often occurs when deliquescent fertilizers are stored in damp or humid conditions. And many a formulator has learned that this can easily be prevented by using Celite*. These tiny particles of diatomite surround the fertilizer crystals or prills with

a protective coating that can prevent contact between them and thus minimize caking.

At the same time Celite fillers improve flowability. The particles are not only microscopic in size but extremely irregular in shape. Thus Celite coated fertilizers flow more freely. As little as 2% of Celite assures more uniform

application in the field.

A Celite engineer will gladly help you put the right grade to work in your fertilizer. Just phone him at your nearest Johns-Manville sales office or write Johns-Manville, Box 14, New York 16, New York. In Canada, address 565 Lakeshore Road East, Port Credit, Ontario.

*Celite is Johns-Manville's registered trade mark for its diatomaceous silica products

when formulated with

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diatomite fillers



Johns-Manville CELITE

INDUSTRY'S MOST VERSATILE
MINERAL FILLER

JUNE, 1961

23

POTASSIUM METAPHOSPHATE... (Continued)

phosphate is more resistant to leaching than potassium chloride.

Outstanding features of potassium metaphosphate are lack of phytotoxicity and freedom from chloride. It may be safely combine-drilled in contact with seeds without causing germination damage.

Excessive pot and field trials have confirmed that the product from the S.A.I. process is in no way different from pure potassium metaphosphate as far as agronomic behaviour is concerned.

INCORPORATION OF POTASSIUM METAPHOSPHATE

Not only is potassium metaphosphate suitable as a PK fertilizer, but it is also a useful concentrated material for use in NPK fertilizers. It is compatible with all known fertilizer materials. In such mixtures the good characteristics of potassium metaphosphate, such as storage properties and lack of phytotoxicity, are liable to be overshadowed by any deleterious properties of the added nitrogen compounds. On the other hand, some nitrogenous constituents partially solu-

bilize its phosphate content.

There are two methods of formulating NPK fertilizers with potassium metaphosphate. Firstly, by simply blending potassium metaphosphate with a suitable nitrogenous material, and potassic material if necessary, and secondly, by hydrolyzing it, usually under acid conditions, and then ammoniating, etc.

The two most important nitrogenous materials which are well suited for blending with it are ammonium nitrate and urea. Ammonium sulfate is not sufficiently concentrated to exploit fully the advantage of the concentrated nature of potassium metaphosphate.

S.A.I. potassium metaphosphate has been successfully wet granulated with ammonium nitrate and potassium sulfate to give a number of NPK compositions. The storage and handling behaviour of these fertilizers is similar to those of conventional fertilizers in present use. Because potassium metaphosphate is partially hydrolyzed in a wet granulation process and is soluble in ammonium nitrate solution, the water-soluble P_2O_5 content of fertilizers based on potassium metaphosphate and ammonium nitrate may be as high as 50% of the total.

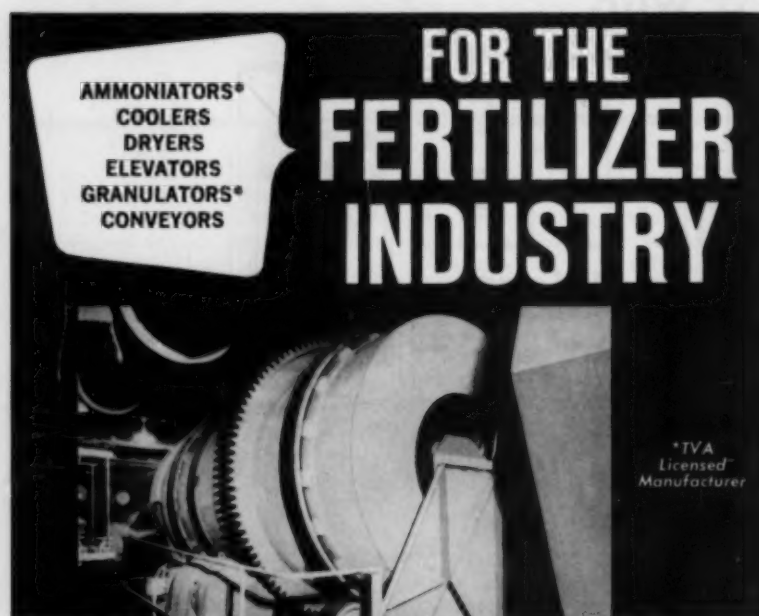
Urea / potassium metaphosphate blends are very well suited for pelleting, are noncorrosive and relatively nonhygroscopic. However, in order to exploit fully the concentration of potassium metaphosphate and give a balanced plant food ratio, relatively large proportions of urea (>10%) have to be used; hence such blends are only suitable in conditions under which straight urea can be used without damage to plants. Urea solutions have no solvent action on potassium metaphosphate.

As mentioned already, NPK fertilizers may be manufactured by ammoniation of acid hydrolyzates of potassium metaphosphate. This technique is one which had been extensively studied especially in the U.S.A. The phosphate content of the products from such hydrolysis processes is largely water-soluble.

Letters Patent have been applied for by Scottish Agricultural Industries Limited on a world-wide basis. The following British Applications relate to various aspects of the process and fertilizers based on potassium metaphosphate.

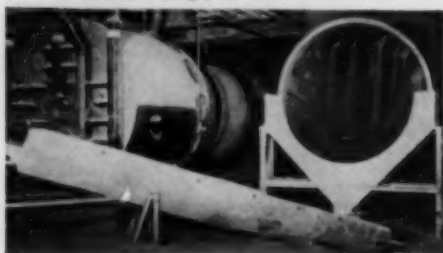
British Application No.	British Patent No.	Subject
24471/57	832,001*	The S.A.I. process.
2463/59	—	NPK fertilizers based on potassium metaphosphate.
9638/60	—	Potassium metaphosphate manufacturing equipment.
12029/60	—	Patent of Addition to 24471/57.

*Specifications herewith. Patent sealed 27th July 1960.



RENNEBURG

7'6" dia. x 15' heavy duty Continuous Combination Ammoniator-Granulator — With 40 HP motor and Renneburg exclusive motorized cam-actuated knockers. Unit handles 70 tons per hour granular fertilizer throughput.



Renneburg Rotary Drying Unit (behind Counter-Current Cooler in foreground) — Equipped with 5-compartment insulated cloth-type collectors, having orlon dust tube filters for effective air pollution control.

24-million BTU/Hr capacity Renneburg Refractoryless Furnace used with 8' dia. x 60' Dryer (left), parallel with 8' x 60' Counter-Current Cooler.



Literature and information on request.

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WHAT ARE DRI-SOL BENEFITS IN MIXED-FERTILIZER PRODUCTION?

REDUCED SHIPPING COSTS

BETTER PROCESS CONTROL

LOWER FORMULATION COSTS

LOWER DRYING COSTS

A DRIER PRODUCT

INCREASED PLANT CAPACITY

FASTER CURING—QUICKER SHIPMENT

IMPROVED FERTILIZER QUALITY



CSC
DRI-SOL

More and more fertilizer manufacturers are turning to DRI-SOL ammoniating solutions as a sure, time-tested way to lower production costs and improve mixed-fertilizer quality.

For in addition to the eight cost-saving and quality-building advantages shown above, DRI-SOL can also help manufacturers offset the high water content of low-strength acid. It also helps to produce grades which are

difficult or impossible to make with conventional solutions.

What grade of DRI-SOL meets your needs best? From a wide choice of formulations you can select the solution that offers you the greatest number of advantages. Each grade contains less than 0.5% water. Grades range from 24% ammonia and 76% ammonium nitrate, to 50% ammonia and 50% ammonium

nitrate, and are generally available in all the Southern and Midwestern States.

Why not get complete information? Technical data to fertilizer manufacturers available upon request. Write: Agricultural Chemicals Department, Commercial Solvents Corporation, 260 Madison Avenue, New York 16, New York. Offices also located in: Atlanta, Shreveport, St. Louis.

COMMERCIAL SOLVENTS CORPORATION





Agriculture Secretary Freeman

*The Economics of
Tomorrow... Future Role
of Extension... Coming
Developments in Farming
are subjects of annual
Greenbrier event*

NPFI Meeting will place **EMPHASIS on FUTURE**

SECRETARY of Agriculture Orville L. Freeman will be among the outstanding group of speakers at the annual convention of the National Plant Food Institute, to be held at The Greenbrier, White Sulphur Springs, W. Va., June 11-14, Institute President Paul T. Truitt announces.

Other prominent authorities in the field of agriculture and economics also are scheduled to be heard.

The program for Monday, June 12 will include: Welcoming remarks by J. D. Stewart, Jr., Louisville, Ky., chairman of the board of directors of the Institute; Dr. Pierre Andre Rinfret, a distinguished economist, who is vice president and director of Economics Division, Lionel D. Edie & Company, Inc., New York City, on "Economics of Tomorrow"; followed by Secretary of Agriculture Freeman.

Other features of the program Monday morning will be the presentation of Distinguished Service Citations to past presidents and past chairmen of the board of the Institute and the Organization's annual business meeting.

On Tuesday, June 13, the program will feature addresses by W. M. Fifield, provost for agriculture, University of

Florida, Gainesville, who will speak on the subject of "Coming Developments in Farming"; Henry L. Ahlgren, associate director, Extension Service, University of Wisconsin, at Madison, who will speak on the "Future Role of Agricultural Extension"; and J. E. Streetman, vice president and director of marketing, Ralston Purina Co., St. Louis, Mo. Scrolls will be presented to the winners in the "Soil Management Award for Editors" contest on Tuesday.

A meeting of the board of directors will be held Sunday evening, June 11 and on Wednesday morning, June 14.

Committee chairmen for the 1961 convention are: Mrs. Gene Van Deren of Cynthiana, Ky., Bridge and Canasta Party Committee; Mrs. J. Fred Corkill of Los Angeles, Calif., Ladies' Golf and Putting Committee; W. R. Morgan of New York City, Men's Golf Committee; Tracy L. Adcock of Chicago, Horseshoe Pitching Contest Committee; Mr. and Mrs. W. B. Copeland of Little Rock, Ark., Hospitality Committee; Mrs. John W. Hall of Denver, Colo., Ladies' Committee; L. Dudley George of Richmond, Va., Memorial Committee; and Dr. Richard B. Bahme of San Francisco, Tennis Committee. ☆

GEIGY—creators of chemicals for modern agriculture

ATRAZINE

Herbicide

For pre-emergence or early post planting weed control in corn. One application controls annual broadleaf weeds and grasses all season.

Non-injurious to corn, safe to handle, non-irritating.

At higher dosage rates, used as a non-selective herbicide for industry.

SIMAZINE

Herbicide

For pre-emergence weed control in corn and in nurseries. One application provides season long control of broadleaf weeds and grasses.

Non-injurious to corn, safe to handle, non-irritating. At higher dosage rates, used for non-selective weed control for industry.

DIAZINON

Insecticide

Highly effective, versatile organic phosphorus insecticide. For dependable multiple insect control on most fruit and vegetable crops; residual fly control in dairy barns, farm buildings and food processing plants. Extensively used by PCO industry for control of roaches and other insects.

METHOXYCHLOR

Insecticide

Multi-purpose insecticide with residual action against insects attacking forage crops and stored grain; and for control of many insect species on fruit and vegetable crops. Direct application to livestock controls horn flies, cattle lice and ticks.

CHLOROBENZILATE

Miticide

Safe, effective miticide for use on deciduous and citrus fruit, ornamentals and nursery stock. Long residual action.

SEQUESTRENE®

Metal Chelates

For correction of minor element deficiencies in ornamentals, fruit trees, vegetables and turf. Compatible with most commonly used insecticides, fungicides and fertilizers.

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or sell these Geigy
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MATERIALS HANDLING CUSTOM APPLICATION



Fred Manuel, plant superintendent for Agrico's North Weymouth plant (now retired) checks a shipment of bagged fertilizer protected by Pillo Pak.



"RIBBED CARLINER"

*is used by
Agrico for
bag protection*

THE shift from pulverized to granular fertilizers has brought many advantages to fertilizer users. At the same time, however, other less-known disadvantages have arisen to plague manufacturers, particularly in shipping.

Shipping damage to multiwall bags is closely related to the form and consistency of the material in the bags. As a rule, finely powdered products in multiwall bags bring few complaints of damage; pelleted or granular products tend to be more free flowing, greatly increasing the tendency to shift. The greatest single cause of multiwall bag damage is movement of the load while in transit.

During the spring of 1957, The American Agricultural Chemical Company noted a sudden increase in bag damage in shipments from their North Weymouth, Massachusetts, plant. This increase corresponded with a shift in production from pulverized to granular fertilizers. Fred Manuel, plant superintendent, called in William Shaughnessy of Bemis Bros. Bag Company, East Pepperell, Massachusetts, and discussed the problem with him.

Shaughnessy was convinced that the increased damage was due primarily to the change in product, not the bag itself. Packaging Materials Corporation,

New York City, was called in, and a series of test shipments was made, using "Pillo Pak," a molded corrugated product which is particularly effective when used as a carliner.

Just one month later, evaluation of the test shipments indicated a solution of the problem. Pillo Pak has been used at Agrico's North Weymouth plant ever since, as well as at other company plants at Carteret, New Jersey, Detroit, Michigan, Cincinnati and Cleveland, Ohio. They're taking no chances on losing customer good will through bag damage.

HOW IS IT DIFFERENT?

What is Pillo Pak's claim to fame? Packaging Materials Corporation is quick to answer:

"Pillo Pak's unique construction makes it the only solid molded corrugated carliner ever produced," according to the manufacturer. How so? The ribs are made of solid pulp instead of being bent from a flat sheet of paper. Thus, it has tremendous resiliency and resistance to compression.

How does it work? By preventing damaging load shifting, when used on the floor of the car, gripping both the lower tier of bags and the floor. The

"indestructible" flute retains its shape even under 80,000-pound carloads of bagged chemicals. Prevented from moving, the bags look like new on arrival—even after the roughest trip.

In addition to holding the bags in place, Pillo Pak protects them from nail heads, splinters and staples on floors and walls. In freight cars, it cushions against the vibration pattern set up by traveling at high speeds over thirty-nine foot rail sections.

The manufacturers of Agrico made an interesting side observation during the testing period. This was that not all damage is immediately apparent; unbroken bags may have undergone stresses that have weakened them to a point just short of breaking. Thus bags that survive the trip from factory to warehouse in apparently good condition break during subsequent handling during delivery. This type of secondary damage was reported to be greatly reduced.

Superior service is becoming increasingly important in maintaining sales growth, as marketing in the farm fertilizer field becomes more competitive. This company knows that the elimination of damage to multiwall bags is an important facet of customer service. ☆

NEW... from Gates!



Rolled up, tank takes little space... Unrolled, your truck quickly becomes a tank truck.

Use any truck to haul liquid fertilizer with Gates Fold-Away Tanks!

A Gates Fold-Away Tank can save you the expense of investing in a tank truck for hauling liquid fertilizer. With the new Gates Tank, your flat-bed, stake or van truck can do the work of both a dry carrier and a tank truck.

It's a simple matter to unroll the Gates Fold-Away Tank on the bed of your truck and fasten it down securely with easy-to-use equipment available from Gates. Your truck is then ready to haul most commercial

fertilizer solutions conveniently and safely.

Upon delivery of the liquid, you can quickly fold the tank and store it at one end of your truck bed. It takes up only a few cubic feet of space. Your truck can then be used to carry dry cargo on the return trip!

For complete information about the money-making benefits of using Gates Fold-Away Tanks, write H. R. Berry, The Gates Rubber Co. Sales Div. Inc. Denver 17, Colorado.

The Gates Rubber Company, Denver, Colorado 80119

Gates Fold-Away Tanks



Special features of Gates Fold-Away Tanks

Six Sizes: 500 gal. to 3250 gal.

Cover: Tough and rugged... resists damaging effects of weather.

Reinforcement: High-strength plies of tire cord and woven fabric.

Lining: Rubber, highly resistant to corrosion.

Building the future on 50 years of progress



new trends in PESTICIDE FORMULATION

FC continues its report on symposium at the American Chemical Society's 139th national meeting in St. Louis, March 21-30. Here are some of the more significant USDA papers presented.

Effects of surfactants on herbicidal activity of foliar-applied chemicals. *L. L. Jansen and W. C. Shaw, Crops Research Division, Agricultural Research Service, U. S. Department of Agriculture, Beltsville, Md.*

Extensive studies of surfactants in relation to the activity of several herbicides demonstrated three characteristic types of surfactant action. Herbicides included the sodium salt of 2,2-dichloropropionic acid (dalapon), the triethanolamine salt of 2,4-dichlorophenoxyacetic acid (2,4-D), the triethanolamine salt of 4,6-dinitro-*o*-sec-butylphenol (DNBP), and 3-amino-1,2,4-triazole (amitrole).

When sublethal dosages of these herbicides were applied as aqueous sprays to corn or soybean plants, the addition of a surfactant enhanced, suppressed, or had no effect on the level of activity which could be attributed to the herbicide itself. Over eighty surfactants, representing four major ionogenic classes, were evaluated. The principal effect in each type of action was a direct function of surfactant concentration. At high (1% w./v.) concentrations, the principal effect of the surfactant on the activity of a specific herbicide could be modified in either a synergistic or additive manner if the surfactant was inherently phytotoxic. No correlations could be established between the ionogenic classes or surface activities of the surfactants and the types of biological action produced.

Some surfactants were studied which enhanced the activity of a particular herbicide on the soybean plant without enhancing the activity of the same herbicide on corn. A single surfactant did not necessarily behave similarly with all

herbicides. The results suggest the possibility of developing tailor-made herbicidal sprays for specific weed-crop situations.

Additional investigations have been initiated to relate surfactant-herbicide activities to specific chemical structures of surfactants and to the bulk properties of the spray systems employed.

Automatic sampling device for improved reproducibility in testing granular materials. *Ernest L. Gooden, Agricultural Research Service, U. S. Department of Agriculture, Beltsville, Md.*

Physical testing of granulated insecticide formulations has been hampered by inadequate reproducibility, particularly in determination of dust content. The variation is due in large measure to the difficulty of maintaining a thorough dispersal of the dust in the stock sample. At the critical level of dust content in relation to specification tolerances, there is an appreciable amount of dust that is free to move about among the granules, so that the ordinary methods of blending and sampling are not dependable.

This paper described a simple mechanical sampling device which allows the whole preblended stock sample to pass in a thin stream, while a rotor removes small cross-section bites at frequent regular intervals, from beginning to end of the stream. All the bites are combined to constitute the test sample. The sampling thus accomplished is on a statistically sound basis, and the operation can be set up readily to yield the necessary size of test sample. The improvement in reproducibility effected by this system is pronounced, in the test for dust content, and is often significant in other tests or analyses where the result may be in-

fluenced by the apportionment of the dust fraction. The apparatus is easily constructed.

Herbicidal activity of granular formulations. *L. L. Danielson and W. A. Gentner, Plant Physiologists, Crops Research Division, Agricultural Research Service, U. S. Department of Agriculture, Beltsville, Md.*

Granular herbicides are prepared by: (1) impregnating granules of clay, perlite, diatomaceous earth, pyrophyllite, vermiculite or plant residues with herbicides; (2) depositing suspensions of finely divided carriers containing herbicides and chemical binders on a basic granule to form a composite or built-up particle; and (3) extrusion of viscous mixtures of herbicides and carriers followed by suitable grinding to provide desired granule sizes.

Spray and granular applications of herbicides are, in general, equally effective in preplanting and pre-emergence treatments when applied with equal uniformity. With certain exceptions, sprays are more effective in controlling growing weeds. Postemergence granular herbicide applications following clean cultivation provide a physical selectivity that avoids or minimizes crop injury and are not intercepted by the crop foliage.

Size and number of granules per unit of area are not highly critical in the performance of vapor-active herbicides such as the carbamates or highly soluble herbicides such as the dinitros. A greater number of granules per unit appears necessary when using slightly soluble herbicides such as the substituted phenylureas and certain of the symmetrical triazines.

Adsorptive capacity and permanency of physical structure are important in the release of herbicides from granular carriers. Isopropyl N-(3-chlorophenyl) carbamate (CIPC) impregnated on uncalcined attapulgite is released readily. By contrast, CIPC impregnated on granular activated charcoal in amounts up to 0.5% are held so strongly that sensitive bioassays cannot detect any release. Comparison of moistened CIPC-impregnated calcined and uncalcined clay granules shows that physical breakdown of the granule is accompanied by increased herbicidal activity. These data are fragmentary and very limited, but the great importance of such information to our understanding of granular herbicide performance is clearly evident.

Basic research on formulation, performance, persistence and selectivity is critically needed to implement our continued progress in establishing effective economical methods of applying granular herbicides. ☆

"B&L LIQUALIZERS GIVE US FAST, FOOLPROOF BLENDING"



says:

LYLE CARPENTER,
Carpenter Supply Co.,
Bondurant, Iowa.

Carpenter Supply Co., Bondurant, Iowa, has built a highly successful business through providing a well-rounded service to farmers. In 1960, a complete B&L plant for manufacturing liquid fertilizers was installed, and in addition several CSC dealers have so far been equipped with B&L Liqualizers for local blending operations.



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Manufacturer and Wholesale Distributors

FERTILIZER • EQUIPMENT • TIRES



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Phone 11704

Mr. W. R. Stephens, Manager
Chemical Plants Division
Barnard & Leas Mfg. Co., Inc.
Cedar Rapids, Iowa

Eliminate operator error

DEAR STEPHENS:

Because we've operated liquid fertilizer blending facilities since 1950, we have a definite yardstick for comparing basic blending equipment with the more elaborate B&L units we installed last year.

Your equipment comes out way ahead from us. As more of our outlets go into blending operations, we're standardizing on B&L Liqualizers. They give us fast, foolproof blending.

Here at our main plant in Bondurant we're very satisfied, also, with the performance of both the B&L Autobatch Skid Plant and the Converter. We're now set up to handle formulas fast and accurately. A customer can give us his order and be on his way with five tons of finished product in around 15 minutes.

Fast Customer service

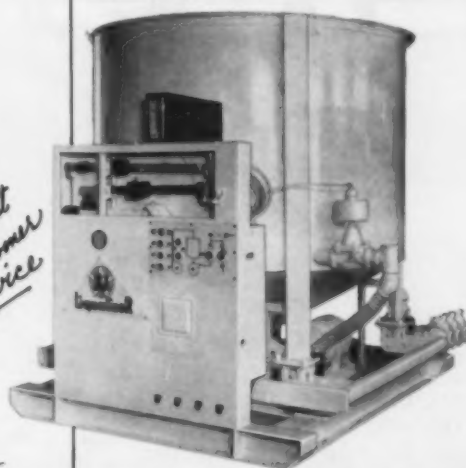
Such custom work is an important part of our business; we're called upon to make some 40 different formulas. However, whether we're custom formulating or producing for storage, we're sure of accurate formulas with this equipment. In my opinion, B&L's combination of meters for measuring ingredients and scales for checking finished product is the most practical method of liquid fertilizer production available.

Sincerely,

CARPENTER SUPPLY CO.

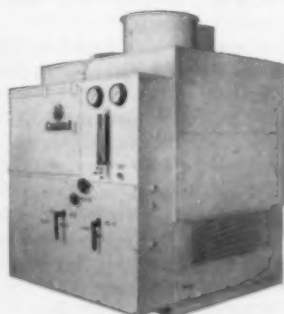
L. L. Carpenter
Lyle Carpenter,
President

most practical system



The B&L Liqualizer

Complete solubility, fast operations, and quality control through semi-automatic features are outstanding advantages of this liquid fertilizer blending unit. A hydro-mix jet and whirlpool action provide superior blending, and scale control of ingredient flow makes precise formulation standard . . . with the Liqualizer. Graphic control panel available as optional equipment.

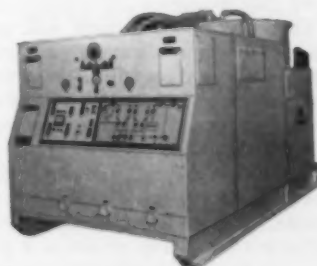


B&L Converter

For economical production of Aqua Ammonia.

B&L Autobatch Skid Plant

For production of 8-24-0 and complete analysis liquid fertilizers — automatically.



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LIQUIDS '61

With 320 plants on stream or under construction in 1959 the liquids industry now finds its growth "leveling off."

About 5 per cent of the mixed plant food consumed in the U. S. is comprised of mixed liquid fertilizer of all types.

Special Staff Report

IN our April 1959 article, "Complete Liquids: Increase and Uncertainty," FARM CHEMICALS reported:

"Liquid fertilizer comprises 3 per cent of the total plant food consumed, and the use may rise to 8-9 per cent in the next ten years."

Now, a little more than two years later we can feel "safe" in estimating that the total mixed liquid fertilizer tonnage now comprises about 780,000 tons, or approximately 5 per cent of the total mixed fertilizer tonnage. Our sources tell us that liquids' rate of growth seems to be *leveling off*, as predicted in our April 1959 article.

This decline in growth will settle down to the approximate growth rate of total mixed fertilizer within the next five to seven years, according to reliable sources contacted in the preparation of this report.

This is the Liquids Industry '61. In a way it isn't just an industry, but a system. Patterned after the needs of the primary crops being grown in a given area, it's the "new kind of farm service" that has bred such catchy phrases as versatile use and application . . . low in cost . . . ease of handling and storage . . . new product appeal . . . and many others.

This report will emphasize what's new in *farmer-owned* application equipment—something that the industry is pressing for. We're bringing you a photo report of the many new commercial and

farmer-built innovations in the storage and application of liquids.

For reasons well known to the industry—such as the inability of liquid concerns to cover a large area adequately in the rush season, large investment in seasonal application machinery, inadequate labor supply which can't be economically employed permanently—farmer-owned application equipment is being promoted by the liquid people in a big way.

Of course, this means there's also a big push on for further investments by the farmer in storage facilities—which have been owned up until now by the producers and loaned to the farmer.

A QUICK REVIEW OF PROGRESS

Before we get into the application and storage side, let's see what's happened in the liquids field since FARM CHEMICALS reported the following back in April 1959:

"Simplicity and convenience is selling—and will continue to sell—liquid fertilizer, all things being equal. But even the simplicity and convenience angle may lose ground in the face of the rising trend of bulk dry fertilizer spreading."

Right off, we can say that "all things aren't remaining equal." Popularity of bulk handling and storage of dry fertilizer was shown to be on the increase in our special report in the March 1961 issue.

But another factor which tended to

slow down the development of the liquid industry from the start—the price of P_2O_5 , has improved greatly. Development of a more refined grade of wet process phosphoric acid has brought the price of white acid down 8 to 10 dollars—or to approximately the price of green acid, about \$82 (FOB).

As reported in the April 1959 issue, Cecil Baylor of Aylco Liquid Fertilizer Company and now with Sohio Chemical Company, developed an agronomic sales manual which salesmen and custom applicators could use in educating—and selling—farmers. "Cec" was just one of many pioneers.

"They were a new breed of men" became the classical line of agricultural journals.

"They were the pioneers, the drummers, the local visionaries, the go-getters. Faced with the time-honored come-and-get-it attitude in a conservative business, these men reversed their procedures with a let's-get-out-and-sell-it policy. In short, the 'new breed' made their own opportunities."

So reported FARM CHEMICALS two years ago.

The Aylward brothers, who had hired Cec Baylor to put their agronomic approach into high gear, have established themselves well in the "liquids hall of fame" and at the same time helped other go-getters get started. Another pioneer is Don Humphrey, Kingston, Ohio, president of the National Fertilizer Solutions Association.

At right is a 500-gallon, 2½-ton non-pressure mild steel broadcaster. Illustrated below right is a barrel carrier mount on the tractor with solution lines running back for band placement on a wheat drill. More photos showing "the equipment parade" appear with the field report which begins on page 34.



Anhydrous ammonia continues to be the No. 1 source of nitrogen for direct application to the soil. More nitrogen is supplied as anhydrous ammonia than in any other form.

U. S. consumption figures show a 24 per cent increase for 1958-59 vs. 1957-58. The increase in the Corn Belt for 1958-59 was even greater—over 35 per cent. Indiana alone showed an increase of 50.7 per cent.

By 1961 it is predicted that U. S. consumption of anhydrous ammonia will double that of 1957-58.

"N" SOLUTIONS STEAL SPOTLIGHT

Nitrogen solutions appear to have taken over the spotlight on rate of growth as, for the first time in the history of the fertilizer industry, total nitrogen exceeded phosphate or potash in total consumption of fertilizer materials.

Nitrogen solutions have compiled a rate of growth from 661,521 tons of nitrogen solutions, as of June 30, 1958, to 938,146 tons of nitrogen solutions, as of June 30, 1959 (see table). That's almost a 42 per cent increase.

Due to the lack of reported information per state, it is difficult to define a given figure. However, we are able to determine long-range trends from these figures.

Based on the USDA report ending June 30, 1959, the fertilizer industry has approximately 16 million tons of total mixed fertilizer—and approximately 1 million tons of nitrogen solutions (aqua, non-pressure and low pressure).

Our estimate, stated earlier, of 780,000 tons, or approximately 5 per cent of the total mixed fertilizer tonnage, would lead us to believe that the growth rate of liquids has leveled off. There are also many evident shifts and trends indicated from agronomic and system philosophy that tempts the editors to pursue the subject further. However, lack of space makes this impossible.



CONSUMPTION OF PLANT FOOD

Continental United States*

	Year Ending 1 July 1950	Year Ending 1 July 1959
Total Tons Fertilizer.....	17,988,968	24,916,974
Total Mixed Fertilizer (tons).....	12,047,379	15,790,393
Average analysis		
N.....	3.9	6.1
Available P ₂ O ₅	11.0	12.7
K ₂ O.....	8.2	11.9
Total Fertilizer Materials (tons/product).....	5,941,589	9,126,581

Tons of Nutrient Basis

Nitrogen (in straight materials).....	488,630	1,652,380
Solid.....	482,764	1,324,029
Liquid (Aqua 24% and Solutions 35%).....	5,866	328,351
P ₂ O ₅ (available) (in straight materials)....	600,862	532,363
K ₂ O (available) (in straight materials)....	78,269	270,071
Nitrogen (in mixed fertilizers).....	467,009	965,268
P ₂ O ₅ (in mixed fertilizers).....	1,329,013	1,997,998
K ₂ O (in mixed fertilizers).....	991,621	1,880,542

*from USDA reports

LIQUIDS '61

Systems for **STORING and APPLYING** *liquid nitrogen and mixtures*



Barrel carrier mount for sidedressing. Close-up (below left) shows that with a little imagination and ingenuity in an off-season, a particular type of knife design for applying nitrogen or mixed fertilizer can easily be made by the farmer.

THE liquids industry is getting plenty of help from the agricultural colleges in promoting the idea that farmers should own and use their own equipment.

Mansel M. Mayeux and Joseph L. Smilie, ag engineers at Louisiana State University, developed the chart on page 36 with recommendations for the various types of tank materials, methods of application, types of systems—as well as the “materials to avoid”—for a given type of fertilizer.

GUIDE TO USE OF TANKS

“Large users of liquid fertilizer find it to their advantage to own some storage tanks,” the engineers report in their bulletin “Choose the Right Liquid Fertilizer Equipment.”

“This makes it possible to have a steady source of supply during application season. Where dealers have storage nearby, this may not be necessary.”

The engineers point out that the size of the storage tank is based on the fertilizer requirements of the farm.



Basic ingredients needed for a solution handling system. This kit is made by Larson Machine Shop, Princeville, Ill.



John Deere broadcaster shown above has interchangeable tanks for a corn planter and corn cultivator.

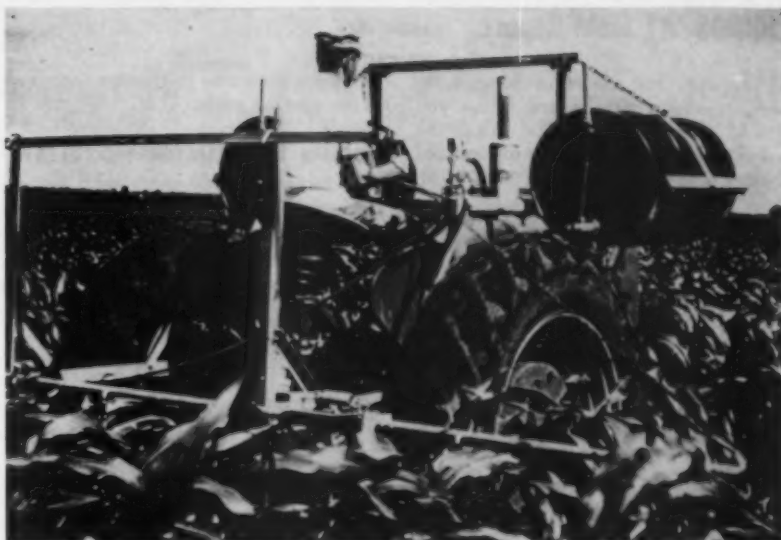
Here's a photo report of new ideas from industry - as well as examples of tremendous imagination and ingenuity on the part of farmers.

"Tanks may vary from 1,000 to 3,000 gallons. Flat bottom, vertical tanks are low in first cost. It is usually less expensive to pump the solution out than to elevate the tanks and let the solution flow out by gravity," the engineers continue.

CONTAINERS FOR SOLUTIONS

The engineer said that containers for solutions containing free ammonia, such as aqua, should have both pressure-relieving valves and vacuum breakers. They warned farmers to avoid joint compounds containing lead or litharge when fitting a tank for nitrogen solutions. They suggested key paste or cup grease.

"Use nurse tanks of 500- to 1,000-gallon capacity to transport the fertilizer from the source of supply to the field," they continued. "Equip these tanks so you can unload the solution into the applicator tank. Do this by installing a pump or compressor on the trailer or by equipping the tank with a small cylinder



With this type of barrel mount a boom is used for dribbling non-pressure nitrogen between the rows. 2,4-D can also be applied—or 2,4-D and non-pressure can be applied together. Spray is limited to no more than 2 inches up the corn stalk.



This aluminum low pressure tank is made by Tryco Manufacturing, Decatur, Ill.



Three 4,000 gallon vertical non-pressure mild steel storage tanks with motor and pump assembly.



Close-up shows a Marlow pump used for transfer of non-pressure solutions.

LIQUIDS '61 Field Report (Continued)

of propane. The use of propane, however, creates a fire hazard which you should guard against. Elevating the nurse tank serves the same purpose, but creates a hazard on highways and hill-sides."

Such tanks as Gates Fold-a-Way with capacities from 500 to 3250 gallons are available.

WHAT TYPE PUMPS?

The engineers described the rotor or diaphragm pump which is in common use for applying liquids. It is usually powered by the tractor or truck P.T.O. drive or by a separate engine. With the use of a bypass valve, a constant pressure of liquid is kept on the nozzles or orifices.

The pressure used, the size of outlets and the tractor speed determine the rate of application. A uniform rate of travel determines the uniformity of application.

Many applicators use the piston pump. Here they vary the stroke of the pump to change the rate of application. Since a ground wheel drives the pump, changes in tractor speed do not affect the rate of application.

The hose pump consists of a series of flexible, plastic hoses stretched over a 4-roller reel. A ground wheel drives the reel. A fixed amount of solution is squeezed out with each turn of the reel. This system is simple. Fertilizer solu-

tion does not come in contact with any of the moving parts.

BOOMS OR CLUSTER NOZZLES?

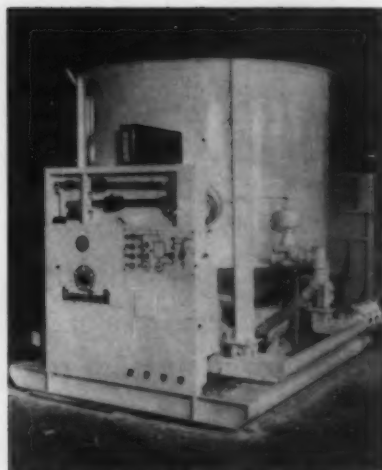
A farmer can do more with pump-equipped systems than with gravity flow systems, according to the engineers.

"With pumps, you can spray the fer-



Pellard Mfg. Co.'s combination applicator for mixed liquid or nitrogen solution. It has fiberglass tank, Dempster pump, spray boom, stainless steel nylon eyelet nozzles.

tilizer on top of the ground or apply it above or below the ground with the use of flow regulators and dribble tubes. It is possible to use booms or cluster noz-



Liquefizer, made by Barnard and Leas, is a scale-mounted, semi-automatic blending unit. Air operated control valves charge and route the finished product.

zles that cover as much as a 60-foot swath," the engineers reported.

They recommended farmers to equip the boom with flat, fan-shaped nozzles.

"Space the nozzles 20 inches apart along the boom. When you apply the fertilizer, the fan covers the entire swath. In dry, hot weather, when there is danger of fertilizer burn to foliage, turn the fans sideways and apply the fertilizer in narrow bands."

They added that cluster nozzles are particularly good for orchard work or rough terrain. Tree limbs are no problem with this method.

(Continued on page 40)

SUMMARY OF RECOMMENDATIONS

Type Fertilizer	Plant Food	Vapor Pressure at 104°F.	Design Pressure	Recommended Tank Material	Closed or Open System	Method of Application	Type System	Materials to Avoid
Anhydrous Ammonia	82% N	211 psi	250	Steel	Closed	Subsurface	Pump Pressure Differential	Brass Copper Monel
Aqua Ammonia	Up to 25% N	Up to 10 psi	15	Steel	Closed	Subsurface	Pump Air	Brass Copper
Complete Neutral Solution	Up to 30 units N-P-K	0	15	Steel Fiberglass Lined Tanks	Open	Subsurface Surface	Pump Air Gravity	Aluminum Brass
Ammonium Phosphate (neutral)	Up to 30 units N - P	0	15	Steel Fiberglass Lined Tanks	Open	Subsurface Surface	Pump Air Gravity	Aluminum Brass
Nitrogen Solution (Non Pressure)	18 to 32% N	0	15	Aluminum Fiberglass Lined Tanks	Open	Subsurface Surface	Pump Air Gravity	Brass Monel
Nitrogen Solution (Low Pressure)	25 to 41% N	1 to 17	30	Aluminum Fiberglass Lined Tanks	Closed	Subsurface	Pump Air	Brass Monel Mild Steel
Phosphoric Acid	64% P ₂ O ₅	0	15	Stainless Steel Fiberglass Lined Tanks	Open	Subsurface Surface	Gravity Air	Aluminum Brass Mild Steel

Note 1. Tanks may be lined with rubber, neoprene, polyethylene and vinyl resins.

Note 2. If other means are used to give the tank rigidity, it is not necessary to design for 15 psi where Zero pressure is to be encountered.



For Nurse Tank Applications

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Self-Priming Centrifugal

Liquid Fertilizer

Pumps



Copper-free
aluminum
construc-
tion for
nitrogen
solutions



Gray iron
construction
with
stainless
steel parts



Transfer of liquid fertilizer requires the best in pumping equipment. These Gorman-Rupp Pumps provide the right construction materials to resist corrosive action and for maximum pumping capacities. The selection is broad—models for complete mix fertilizer, for aqua ammonia, and for nitrogen solutions, all with built-in seal protection. See your Gorman-Rupp Distributor for the pump best suited for your particular needs.

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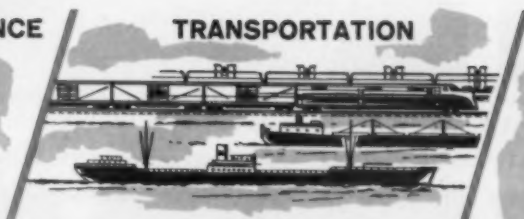
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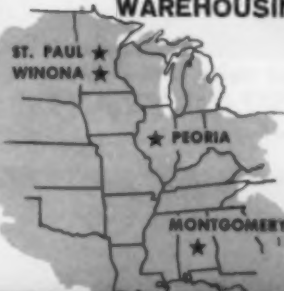
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CORPORATION

LIQUIDS '61 Field Report (Continued)



Fast, automatic production of 8-24-0 and complete analysis liquid fertilizers is assured with Barnard & Leas Autobatch skid plant.



Unload solutions from nurse tank quickly with German-Rupp self-priming centrifugal liquid fertilizer pumps. Built to resist corrosion.



Balanced liquid fertilizer plant of Agricultural Business Co. is shown in operation, producing 15 tons per hour of 8-24-0 with a new, continuous process.



This mild steel non pressure sidedresser is made by Larson Machine Shop, Princeville, Illinois.

"Give particular care to the auxiliary equipment used. Stainless steel strainers are well worth the extra money. Diaphragm valves are very effective. Consider rigid and semi-rigid polyvinyl chloride piping and fitting. It will withstand any of the liquid fertilizers. Use gage protectors or stainless steel gages and use cup grease rather than litharge or glycerine as thread lubricant," Mayeaux said.

"Decide what fertilizer you plan to use, then study the table. There is a solution to fit your needs and equipment available to apply it. Learn to know the many kinds so that you too may become a satisfied user of liquid fertilizer," the ag engineer concluded.

WATCH THESE MATERIALS

Fiberglass tanks are being used extensively in the liquid fertilizer and pesticide trades. They're meeting with enthusiasm because if pierced, broken,

or opened up accidentally, they can be patched in the field by the user himself.

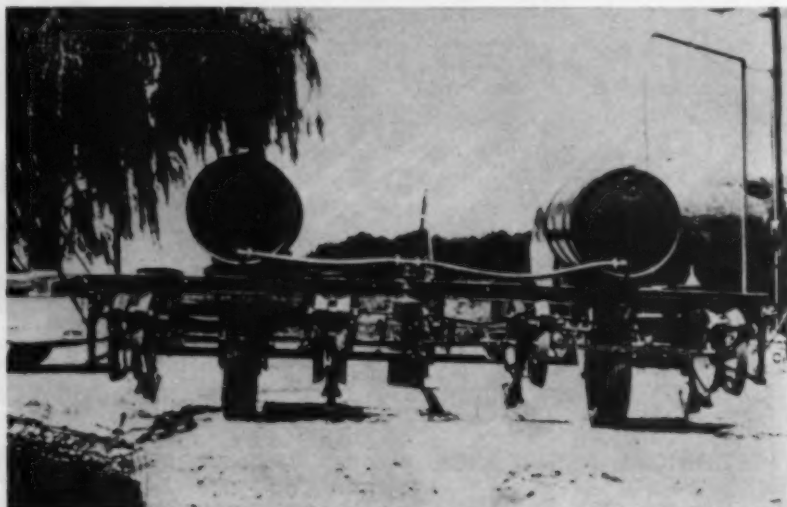
Tryco is offering a tank that handles every solution. They're available in sizes from 113 to 300 gallons. For nurse tank service they have a 600-gallon job.

Gates Fold-Away Tank can be carried on a flat-bed or van truck—doing the work of a dry carrier and tank truck. This is offered by The Gates Rubber Company.

New design Gorman-Rupp Pump in 1½" and 2" sizes is engineered to eliminate 95% of seal failures and pump breakdowns. This new concept in pumps will be available for the fall fertilizer season.

Stainless steels, still most popular, are changing all the time. Watch for new advances here.

Epoxy resin coatings, spray or brush applied, are coming in stronger. They're relatively inexpensive—with lots of promise. ☆



"Home-made" starter fertilizer attachment for a corn planter.



Another "home-made" starter attachment for corn planter. Nurse tank is mounted on the back of a pick-up truck.



Ready for the field. Nurse tank is coupled to Tryco applicator of Merriman Truck Service, Monticello, Illinois.



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WITH MINUTE MAN PHOSPHATE ROCK, GROUND
PHOSPHATE ROCK AND TRIPLE SUPERPHOSPHATE

Insect Conditions during April

THE GREENBUG continued to cause damage in parts of Oklahoma and Texas during April. The insect was of concern throughout Oklahoma by the middle of the month with spraying rather general. Populations, however, were showing some decline in the southwestern part of the state late in the month, but serious damage was still occurring in isolated fields of small grain in various areas.

In the Panhandle and Red River counties of Texas, greenbug populations ranged from light to heavy. Counts as high as 5,000-6,000 per foot were recorded in several panhandle counties. Controls gave good results and wheat was reported as looking good.

By the latter part of April, greenbugs were appearing in the extreme southwestern portion of Missouri. Counts ranged from zero to several hundred per foot of row with one field in Jasper County having a count of 2,000 per foot. Damaging infestations of the insect were reported from southern Crowley and Summer Counties, Kansas. Counts varied from less than one to 50 per foot of row in other Kansas counties reporting. Arkansas, New Mexico, Nebraska, and Colorado reported light populations the latter part of April.

Populations of the **pea aphid** were beginning to build up over a wide area of the country by late April. The insect was reported as being light on alfalfa in Delaware, Maryland, and Virginia, but evidence of increases were noted. In Illinois, counts in clover and alfalfa ranged from 26 to 130 per square foot. Counts were light in Arkansas, Kansas, Missouri, and Nebraska, but ranged from moderate to heavy in Oklahoma.

Pea aphid populations ranged from 1,200-1,500 per sweep on volunteer Hubam clover in Bell County, Texas. On vetch in several other central Texas

counties counts ranged 500-1,000 per sweep. Widespread infestations of varying degrees on leguminous crops were reported from other sections of the state. In New Mexico, heavy, spotted infestations damaged alfalfa in Chaves and Eddy Counties but populations were on the decrease in northern Dona Ana County. The aphid was heavy on alfalfa throughout Arizona and in localized areas of Utah. Populations varied widely in Nevada. Generally, counts were light, but in one field near Reno, populations of several thousand per square foot caused heavy damage.

The pea aphid was building up in the Clearwater River area of Idaho much earlier than observed in the past few years.

By the latter part of April the **alfalfa weevil** was rather active in both eastern and western United States. In Delaware, larval numbers were on the increase in Sussex County with injury more noticeable in untreated alfalfa. Heavy injury was noted in a Prince George County, Maryland, location but populations were light in other sections of the state. In Virginia, first infestations were found in fields which had not been treated in the fall of 1960. Many infestations have been treated this spring with good results. Populations in Morgan County, Georgia, averaged 55 per sweep but fields treated last fall averaged one larva per 10 sweeps. In South Carolina, the weevil has destroyed most of the alfalfa crop in Cherokee County. The portion of the crop remaining had received fall treatment. Twelve Tennessee counties were reported infested by the alfalfa weevil for the first time during April.

Alfalfa weevil adult feeding was noted in some fields of alfalfa in Colorado and it was expected that controls might be needed after the first cutting of hay. In Goshen, Laramie, and Platte Counties, Wyoming, adults averaged one per square foot of alfalfa crown. Controls

were necessary in localized areas of Utah and it was estimated that by late April 75 per cent of the alfalfa had been treated in Wasatch County.

Mites were causing damage to wheat in local areas of Kansas and were increasing on that crop in Colorado. Light populations were reported from Oklahoma and Nevada.

Some cotton insects were beginning to show activity by the latter part of April. **Boll weevils** were found in most cotton fields of the four lower Rio Grande Valley counties and some activity was noted in the Coastal Bend counties of the state. **Wireworms** were causing damage in some young cotton fields of Jim Wells, Bee, Live Oak and McMullen Counties. **Spider mites** and **flea hoppers** were present in both the Coastal Bend and Valley areas. In western Frio County, many cotton fields were treated for **aphids**.

In some Yuma County, Arizona, cotton fields about 50 per cent of the seedling plants were infested with the **beet armyworm**. Most larvae were first and second instar and egg counts were high. **Darkling beetles** were causing damage to some seedling cotton in central Arizona and thrips averaged 10-15 per 20 plants in localized areas. ☆

All planes arriving at New York from Paris, France, were being sprayed with insecticides to destroy a chafer not found in North America, USDA reported recently. The reddish-brown beetle, *Melolontha melolontha*, had suddenly appeared in numbers on planes arriving from Paris at Idlewild International Airport. It belongs to the same family as the destructive Japanese beetle, which costs American farmers and city dwellers \$10 million annually. The chafer attacks more than 60 different fruits, vegetables, field crops, ornamental plants and trees.

Under a program of the ARS Plant Pest Control Div., soil insecticides have been applied cooperatively by airports and ARS to more than 10,000 acres of airport grounds in the northeastern Great Lakes and middle Atlantic States.

*Chief Staff Officer, Survey & Detection Operations, Plant Pest Control Div., Agricultural Research Service, USDA.

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XN61-1

PRODUCTION OF AMMONIUM PHOSPHATE FERTILIZER

U. S. 2,969,280, issued Jan. 24, 1961 to Alvin W. Peck and assigned to Phillips Petroleum Co., provides a process and apparatus for producing aqueous ammonium phosphate fertilizer which is sufficiently cool for storage and handling without undue vaporization loss.

In the figure below, numeral 1 identifies a sump containing a body of water 4. A tank 2 is supported within tank 1 so that the bottom of the tank 2 can be contacted with the water for heat exchange purposes. Around the outer periphery of tank 2 near its top are one or more external spray rings 6. A pump 3 draws water from tank 1 through pipe 16 and transfers it through pipe 5 to spray rings 6.

A chemical reaction vessel 9 is provided, into which communicate reagent inlet conduits 18, 19, and 20. Conduit 12 communicates tank 2 by way of pump 10 with the chemical reaction vessel 9. A second conduit 13 communicates the chemical reaction vessel with the tank 2. Conduit 13 is provided with a pump 11. A pipe 8 containing a valve 14 is connected with pipe 13 as illustrated. Pipe 8 extends upward and communicates with internal spray ring 7.

Conduit 13 extends through the wall of tank 2 and is provided with agitation means 15 suitable for mixing the liquid contents of the tank so as to maintain as nearly uniform temperature as possible.

A vapor recovery unit 17, including

a water spray, is provided in communication with the space of tank 1 normally containing vapor so as to prevent escape of volatile components to the atmosphere.

The chemical reaction vessel is provided with inlet conduits 18, 19, and 20 for inlet of fertilizer producing components. Conduit 18 is intended for the introduction of anhydrous ammonia, conduit 19 for the introduction of water, and conduit 20 for the introduction of phosphoric acid. For ease of control of this system a temperature recorder controller apparatus 28 includes a temperature responsive device 33, such as a thermocouple, motor valve in conduit 18 and a recorder-controller element, set to operate a valve to regulate the flow of liquid in pipe 18 in response to changes in the temperature. A rate-of-flow controller assembly 23 is also provided for regulating the rate of flow of water in conduit 19, or the rate of flow of water in conduit 19 and the rate of flow of phosphoric acid in conduit 20 in response to the rate of flow of ammonia in conduit 18.

FERTILIZERS

U. S. 2,968,525, issued Jan. 17, 1961 to Howard P. Clark and Albert Adams, assigned to International Minerals & Chemical Corp., describes a process for beneficiating sylvinitic ore containing carnallite.

U. S. 2,968,528, issued Jan. 17, 1961 to Raymond E. Tuttle, William W. Harwood, and Donald J. Smalter, assigned to International Minerals &

Chemical Corp., describes a process for clarifying concentrated wet process phosphoric acid.

U. S. 2,968,543 and **2,968,545-6**, issued Jan. 17, 1961 to Hugo Nees et al, and assigned to Chemische Fabrik Kalk G.m.b.H., describe processes for producing complex fertilizers containing phosphate.

U. S. 2,968,833, issued Jan. 24, 1961 to Clark G. DeHaven and Richard O. Welty, assigned to Phillips Petroleum Co., provides a method and apparatus for producing uniformly sized prills from ammonium nitrate melts.

U. S. 2,969,277, issued Jan. 24, 1961 to Peter M. Carlsson and Kai F. Petersen, assigned to Dano Ingeniørforretning og Maskinfabrik, describes an apparatus for the fermentation of solid organic materials to produce compost.

U. S. 2,969,279, issued Jan. 24, 1961 to Norman A. Pierson and assigned to Naturizer Co., describes a method of decomposing municipal refuse to produce a soil nutrient.

U. S. 2,970,039, issued Jan. 31, 1961 to Angel Vian-Ortuno and Alicia Crespi-Gonzalez, describes a process for the production of ammonium sulfate from sulfur dioxide-containing gas.

U. S. 2,971,832, issued Feb. 14, 1961 to Thomas H. Stewart, Jr., and Robert A. MacDonald, assigned to International Minerals & Chemical Corp., describes a process of producing a granular mixed fertilizer product of relatively uniform size.

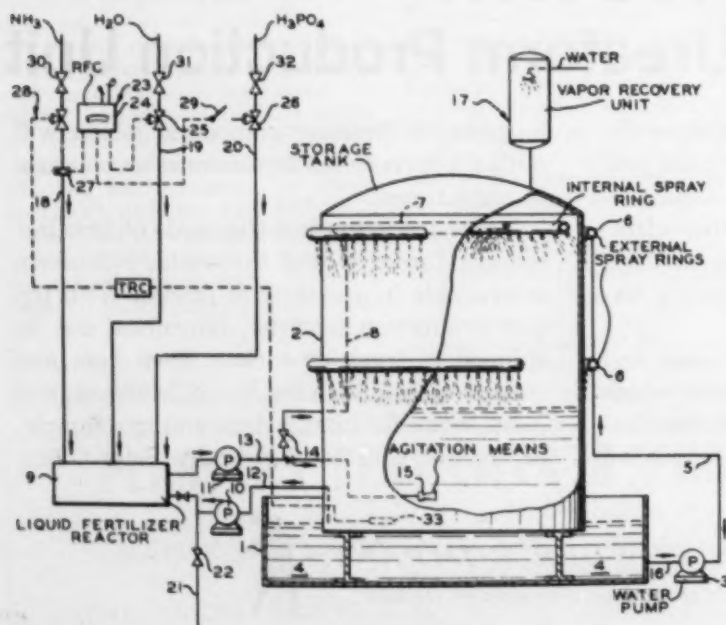
U. S. 2,971,831, issued Feb. 14, 1961 to Yves Martin and assigned to Compagnie de Saint-Gobain, describes a method of making superphosphate having granules mainly between 1.5 and 5 mm. in diameter.


PESTICIDES

U. S. 2,970,939, issued Feb. 7, 1961 to Eldon G. Maitlen and assigned to Food Machinery & Chemical Corp., discloses the nematocidal properties of N-nitroso-N, N-dimethylamine.

U. S. 2,970,941, issued Feb. 7, 1961 to Robert L. Holbrook and assigned to Olin Mathieson Chemical Corp., discloses the use for the control of foliar fungi of 2, 4-dinitro-phenylhydrazones.

U. S. 2,970,048, issued Jan. 31, 1961 to Philip C. Hamm and Robert E. Miller, assigned to Monsanto Chemical Co., discloses a method of defoliating plants with pyridine-2-methano methiodide phenylhydrazones.





A \$60,000,000 STEP IN ARMOUR'S PROGRAM OF PROGRESS

As America's need for more and better fertilizers grows, Armour Agricultural Chemical Company continues to improve its products and expand its facilities. The latest example of Armour's progressive philosophy is its new \$60,000,000 program for increasing its nitrogen and phosphate production facilities. By 1962, new installations will approximately TRIPLE Armour's production of these materials. A nitrogen plant will be built near Sheffield, Alabama, and a phosphate plant near Fort Meade, Florida. In addition, facilities for manufacturing mixed fertilizers will be expanded and modernized.

New installations larger facilities and ever-improving technical methods have made Armour the most respected name in the fertilizer industry: a name synonymous with quality and dependability. The Armour Program of Progress is devoted to improving the products and services that have made the Armour "A" a symbol of quality in the fertilizer industry . . . the "BIG A" in agriculture.

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*For optimum plant growth,
we need a better understanding of*

FERTILIZER—MOISTURE RELATIONSHIPS

By DR. RICHARD B. BAHME*

WESTERN farmers who irrigate and fertilize have about a three-fold better chance of making a higher income than those who don't. These advantageous odds were found as a result of a survey supported by the National Plant Food Institute. The survey showed that in the West, 96 per cent of the high level fertilizer users irrigate as contrasted to 48 per cent of non-users, and that 91 per cent of high level users grossed over \$10,000 per year as compared to 36 per cent of non-users.

Irrigation farmers realize that closer control of soil fertility and moisture may lead to more profitable production, providing we determine the optimum combination of these growth factors for a particular crop and set of conditions, such as soil type, climate and irrigation practices.

This requires much research. Once the optimum combination has been determined through careful research, then practical methods and equipment must be available to establish and regulate soil fertility and moisture. This is difficult because even with effective instrumentation, it requires intelligent and close management by the grower and fertilizer—irrigation service groups.

Soil and plant analysis, and moisture testing instruments, such as resistance blocks tensiometers, provide measurements, but the meaning and interpretation of these measurements for a particular soil and growth stage of a crop is necessary in order to irrigate or fertilize scientifically and efficiently. The moisture content of most plant tissues decreases with age and maturity. If we had information concerning the optimum moisture content of well fertilized crops at critical stages of growth, perhaps new techniques could be developed to more easily achieve better yields of

high quality crops for maximum profits. These techniques have been highly developed in the Hawaiian sugar cane industry whereby sugar yields of 20 tons per acre are obtained by scientific control of moisture and nutrients in both the soil and crop; thus regulating two of the most dominant factors influencing yields and quality.

Here on the mainland, under ideal conditions, sugar beet growers are realizing new yield goals of high quality beets with the proper combination of adapted hybrids, plant spacing, pest control, fertilization and sprinkler irrigation.

Last year the National Plant Food Institute honored the undisputed "World Champion Beet Sugar Producer" John Domingos of Salinas, California. He produced 53.6 tons of beets per acre which averaged 15.9 per cent sucrose to yield 8½ tons of pure beet sugar per acre. In contrast, Monterey County, California, averaged only 31 tons of beets for 4¾ tons of sugar per acre.

Skillful management practices by Domingos included: planting early and harvesting late for a long period of sugar production; perfect stand; 200 pounds of nitrogen per acre, applied early with an ample supply of other nutrients, from a fertile soil; good pest control; and most important, *five properly scheduled sprinkler irrigations*. It would be interesting to know how he determined his irrigations.

RESPONSE OF ALFALFA

Alfalfa responds quickly to good fertilization and irrigation. A four year study in Arizona, using three hundred pounds of phosphate, showed increased hay yields of 10 tons per acre, also lowered water used per ton by 40 per cent, and gave \$113.00 per acre more income than the 100 pound per acre rate of phosphate. Arizona growers know from experience that it pays to use plenty of the right kinds of fertilizer with their high cost water. As water costs climb, more growers will use more fertilizer

for optimum yields.

CORN GROWING

In the Midwest, corn growing has traditionally depended upon rainfall and stored soil moisture for good yields. Proper fertilization improves water use efficiency, stimulates greater rooting depth, and yields may be increased four-fold. Moisture is conserved by more shading and improved soil organic matter levels. In one trial, the plant pump processed 5,600 gallons of water per bushel on the fertilized as compared to 21,000 gallons per bushel on the unfertilized.

Starved corn is really thirsty even though it is stunted. In Colorado, 150 pounds of nitrogen increased corn yields 56 bushels for \$67.20 additional profit when 9.6 acre inches of water was applied. Even under dry conditions, corn yields went up 39 bushels when 150 pounds of nitrogen was used, giving extra return of \$46.50 per acre.

Two and one-half bushels more corn were produced per acre inch of water when soil fertility and moisture were not limiting. On fertile Wyoming soils, frequent irrigations gave three more tons of corn ensilage for a total of 23.2 tons as compared to 19.3 tons where irrigation was poor. Ample supplies of water and nitrogen produce abundant and nutritious ensilage.

In California cotton growers are combining heavy stands, high fertility and ample moisture to get four bale cotton. When nitrogen is well supplied, potash has been shown to be deficient in many San Joaquin Valley soils. Even when irrigation is adequate potash deficiencies result in stunted, moisture-starved plants. Potash deficient leaves are small, yellow with marginal scorch, and so dry they crumble and crackle when crushed. Potash deficiencies appear to limit water uptake and to induce drouthiness. The interaction between potash and moisture may be shown in a different way when potash deficiencies are induced in California vineyards by

*Talk presented by R. B. Bahme, Western Regional Director, NPFI, at the Sprinkler Irrigation Association Conference, Brown Palace Hotel, Denver, Colorado.

N P₂ Q₅ K₂ O

12-12-12 16-8-8 14-0-14 15-10-10 20-10-10 12-12-12 16-8-8 14-0-14 15-10-10 20-10-10 12-12-12

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FERTILIZER—MOISTURE... (Continued)

insufficient moisture.

Nitrogen, phosphate and potash levels were increased significantly in grape vines and berries with irrigation, according to recent research by the University of California. Without irrigation wine grape yields were 15 pounds per vine; with six inches of water, yields doubled to 31 pounds; and when 18 inches was applied during the growing season, grape yields jumped to 48 pounds. All treatments were harvested at equivalent maturity of 21 per cent sugar content.

The delayed harvest readiness (at 21 per cent sugar) for the irrigated vines produced over a three-fold increase in high quality grapes. It also seems likely that moisture limitations in many non-irrigated vineyards may be partially overcome by fertilizer.

Other cultural practices must be considered along with soil fertility and moisture and we have heard a great deal about the importance of soil compaction which hinders root growth and nutrient uptake, including water.

Water is important to the plant in many ways, but particularly, as an actual nutrient and a mineral nutrient carrier. Soils are compacted more easily as the moisture percentage increases from dry to field capacity. Fertilizers and water are not utilized efficiently on compacted soils.

RESEARCH UNDERWAY

The fertilizer industry has recognized the need for increased knowledge of how water and fertilizer improve plant growth. Through research grants in various parts of the U. S. we are obtaining more facts with which to effectively sell fertilizer and irrigation. In California we are supporting water—fertility research on sorghum and sugar beets and in Colorado on sugar beets and wheatgrass range. Other opportunities exist to obtain information of this sort which can be used in a number of ways to increase the use of our products.

From a research point of view, moisture and nutrient relationships are better understood for the extremes—wet or dry, high or low fertility—than for the optimum.

When over-irrigation occurs, the excess water causes reduced yields due to poor aeration and leaching of highly mobile nutrients. When a crop is under-irrigated, moisture may be the most limiting factor for a given set of nutrient concentrations. Water and nutrient availability may independently affect yields and a lack of either would result in lower yields.

Some fundamental research into soil moisture—fertility relationships at the

University of California gives promise of elucidating some of the basic principles involved.

The National Plant Food Institute has for several years helped support this effort to develop some new techniques which permit independent manipulation of the root—moisture—nutrient variables to facilitate better control of experimental conditions. But we cannot stand still until this information is available.

The economists forecast that rising production costs will hasten farmer acceptance of yield and income increasing practices, such as irrigation and fertilization. But we cannot rely on this to do the job. We must communicate profit-making ideas which motivate and sell farmers to use our products.

Here are a few examples of how the fertilizer industry is using information developed through research to convey information in practical terms to bankers and growers. Our industries need to do a better job of cooperating to tell the amazing facts about fertilizer and irrigation and how they work together as a team for the farmer. A deficiency of either fertilizer or water jeopardizes the effectiveness of the other. Fear of dry weather and lack of rainfall are barriers to fertilizer use by large numbers of farmers over the United States who do not irrigate.

We can best meet this challenge by working together to generate new income for farmers and at the same time for our own industries. ☆

LIGHT-GROWTH DISCOVERIES

If you're "in the dark" concerning the effect of light and color on plants, USDA's Agricultural Research Service has just issued Special Report 22-64 titled "Plant Light-Growth Discoveries—From Photoperiodism to Phytochrome" (plant color). Scientists in this field predict that discoveries in the coming decade should outstrip past progress in explaining why plants grow as they do on a sunlit earth.

RANGELAND FERTILIZATION

The exciting story of rangeland fertilization, much of it seen through the eyes of an applicator airplane, is told in a recent Ortho Agricultural Newsreel release from California Chemical Co.

Much of the footage was shot in the "Mother Lode" country of California, a terrain of rolling hills where the airplane becomes an important partner in fertilizer application.

The motion picture outlines the important steps in a rangeland fertilizer program; good management practices, use of marginal land and utilization of the extra feed that fertilization provides.

SYMBOLS OF PLANT LIFE



In mediebal times, the "black art" of alchemy was condemned by superstitious authorities hardly less ignorant of chemistry than the masses. To avoid persecution . . . and possible execution . . . for witchcraft, alchemists invented secret symbols for use in their experiments with potash and other basic elements.

TODAY, EXPERIMENTS ARE STILL BEING MADE WITH POTASH . . . BUT NOW NO SECRETS SURROUND ITS IMPORTANCE IN AGRICULTURE.

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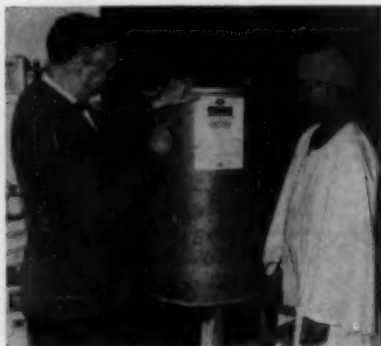


The Slurry

BETTER LATE THAN NEVER

Astronaut and entomologist! With the principals bearing those titles the name's the same. What's more, our nation can point with pride to both of their achievements—one out in space and the other on the ground, where for better or for worse we mortals will continue to live for quite a few years.

While Commander Alan B. Shepard was preparing for his great flight, Dr. Harold H. Shepard, noted entomologist who is now with the USDA as coordinator of USDA defense activities, was making a big hit in Cairo. But to tell this story we've got to go back a few years.



Dr. Shepard, one of this country's "secret weapons" at the agricultural chemicals research display in Cairo recently, shows an Arab farmer how agricultural abundance is realized.

Dr. Shepard left Minnesota in 1943, just ahead of Abdel Aziz Fathy's arrival at the university. Dr. Fathy, now director general of Crop Protection Department in the Egyptian Ministry of Agriculture, came to America after reading Dr. Shepard's book — "The Chemistry and Toxicology of Insects" — and earned M. S. and Ph.D. degrees in entomology at the University of Minnesota. Dr. Shepard's book, published in 1939, was an accepted world authority on insecticides.

Well, Dr. Fathy finally caught up with this professor in Cairo recently. Dr. Shepard was in charge of the agricultural chemicals research display there.

Soon after the meeting at the display, Dr. Shepard conducted a seminar on "chemicals in agriculture." Dr. Fathy was finally listening to a lecture by the man he had wanted to study under nearly 20 years ago. What's more, he had brought his whole staff along!

BENSON'S "NEW LINE"

Ever wonder what happened to former Secretary of Agriculture Ezra Taft Benson? Latest word we have is that he was elected a director of Corn Products Co. His latest "kick" is "improving

nutritional standards for people everywhere."

ED PAMPERS HIS FARMERS

One of our cover personalities of a couple years back, Edwin C. Aylward of Aylco Chemical Company, Inc., Sullivan, Ill., has come up with a crop insurance plan with no premium costs to the farmer.

The plan enables farmers to add to their original policy's coverage—by endorsements from Aylco—to acreage on which farmers have applied the company's liquid fertilizer.

Farmers will obtain credit against liquid fertilizer purchases in case of hail or fire damage. The amount will be equal to the farmer's crop insurance settlement. If the farmer should discontinue farming by March 1 of the succeeding year or move to a non-Aylco area, he will receive the amount of credit in cash, the company says.

Ultimate Cost of Plant Food Will Play Dominant Role in the Future

Whichever segment of the chemical industry can put plant food "on the field or in the furrow" at the lowest cost "will dominate the future."

So reported M. D. Sanders, of the Agricultural Chemical Division of Swift & Company, Chicago, in a paper presented during a joint meeting of the American Institute of Chemical Engineers and the Chemical Engineering Division of the Chemical Institute of Canada.

Up to now, Sanders pointed out, the chemical plant food industry has consisted of two major divisions: the producers of the basic materials and the mixers and granulators of complete NPK plant foods who buy all their raw materials from the basic producers.

Recently, however, "three additional routes from basic producers to the consumer have made their appearance:"

- 1) Some producers of phosphates have also become basic in nitrogen, resulting in marketing of ammonium phosphates direct to consumers as well as to mixers and granulators.

- 2) Some producers of nitrogen have gone the nitro-phosphate route to complete NPK plant foods.

- 3) Innumerable small, highly localized operations are now formulating liquids from phosphoric acid, ammonia and soluble salts, or dry mixing granulated and sized nitrogen phosphate and potash materials to grade or to prescription, often coupled with an application service.

"Which of the four methods of serving the consumer will dominate the future, in the last analysis, depends on the final cost of the food as applied in the furrow or on the field." ☆

STAFFING

your organization

(Continued from page 14)

Now the next step is the development interview, and this should occur soon after the appraisal and analysis. The real reason why most managers are afraid to do appraisals is because they've got to bring the appraisee in and talk with him. They've got to tell him where he went wrong or at least they think they have to tell him where he went wrong. If you start telling people where they went wrong, you immediately set up a barrier to communication. You just can't get through to him. As soon as you say, "Jim, you certainly flubbed this," immediately he's on the defensive. So what do you do? Well, you have the result of the appraisal, so you bring in the individual and you talk strictly from the accomplishment viewpoint. You say, "Jim, you were supposed to get the price of item #447 down by 15 per cent. Now, you were able to get it down to 12 per cent. I think that's darn good. We didn't make the 15 per cent, but we'll go back and try for it again."

In this way you can establish a relationship which is good and you'll get Jim to talk. He will ultimately come out and say to you something like this, "Well I think maybe I was driving those fellows a little too hard." Now, he's admitted to a weakness and is looking for help. Now you can talk about his driving tactics without offending him and putting him on the defensive.

If you as the manager sit in the position of just a guide and steer this development interview so that the appraisee does most of the talking, then he will tell you his troubles and why he didn't make certain goals—and you'll learn a lot more than if you start out to tell him where he went wrong.

Once you have gotten to this point, you both set up some definite development plans for him and how they will be put into action.

That pretty well describes the process by which people can be encouraged to develop themselves in their jobs. Certainly you will not have any difficulty selling it because it's logical, it's believable, it's useable and it's something that people want.

What has been outlined for you isn't anything new. This method isn't anything more than what you're supposed to be doing now! It's just a different way of doing it to insure success. Make sure you get the job descriptions and goals in writing as we indicated.

In this way you put the burden on the fellow who's being developed and you'll never have to worry about a development interview again if you follow this technique. ☆



Just Say



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1961

• DIRECTORY OF THE INDUSTRY

• BUYER'S GUIDE

• TECHNICAL DICTIONARY

• STATE LAW SUMMARIES

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FARM CHEMICALS HANDBOOK is a *working* guide to the pesticide and fertilizer manufacturing industry. You will use the HANDBOOK as a sales guide, a manufacturing guide, and a buyer's guide. At the same time, it puts at your finger tips a ready reference to all the basic data involved in the farm chemicals industry.

You can reserve your copy of the 1961 HANDBOOK simply by filling out the attached self-addressed postage-free card. And because your advance order cuts costs (by enabling us to establish one economical press run), your reservation *now* entitles you to a special pre-publication price of \$5.00, or a 33 $\frac{1}{3}$ % saving.

A DAILY REFERENCE

FARM CHEMICALS HANDBOOK has over 2300 listings of important pesticide and fertilizer manufacturers in 50 states, Canada, and Puerto Rico. Each listing gives the name of the company, address, phone, freight siding, and names of principal executive officers. Also the type of fertilizer plant is listed (complete with acid chambers, dry mixing, liquid mixing, etc.) and in the case of pesticide plants, the type of product produced (dusts, emulsions, fungicides, defoliants, etc.) Listings are geographical with an alphabetical index. Also, fertilizer spreaders and pesticide applicators are listed.

PLANT FOOD DICTIONARY

Your copy of the 1961 HANDBOOK will also contain the revised Dictionary of Plant Foods, 52 pages of definitions and explanatory information on everything from Acidulated Bone to Zinc Oxide. The *Pesticide Dictionary* gives standard AAPCO definitions, lists principal basic suppliers and chemical formulae. There are over 500 different listings containing definitions and pertinent information on such materials as anisomycin, Thimet, and Zytron. Listed are Insecticides,

Fungicides, Herbicides, Fumigants, Diluents, Adhesives, Safeners, etc.

BUYER'S GUIDE

The Buyer's Guide lists chemicals and services and equipment and supplies and from what companies they can be obtained. There is a complete alphabetical listing of over 780 suppliers to the farm chemicals industry. Never before under one cover has such a wealth of material been brought together for your use with all listings revised, corrected, and brought up-to-date each year.

In addition, there are State Plant Food Law Summaries (26 pages), State Pesticide Law Summaries (14 pages). Each State Summary contains the names and addresses of State Control Officials plus any significant changes in the law which may have taken place in the preceding year.

EVERY 30 SECONDS

Surveys show the HANDBOOK is referred to on the average of 8.4 times a month by each subscriber. Every 30 seconds, day in and day out, a copy of the HANDBOOK is opened to give vital information to make important decisions. Now is the time to make sure that you will have the advantage of this valuable reference. Here is what one important user of the HANDBOOK had to say: "We probably refer to FARM CHEMICALS HANDBOOK more frequently than all of the other texts and publications in the field combined."

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IMPORTANT

It is important to note that the pre-publication offer expires on July 15th. The HANDBOOK will not be sold by salesmen and it can only be obtained at the special pre-publication price by advance reservation. *There is no free distribution.*

For multiple copies with your imprint please write:

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PUBLICATION DATE - SEPTEMBER 1ST

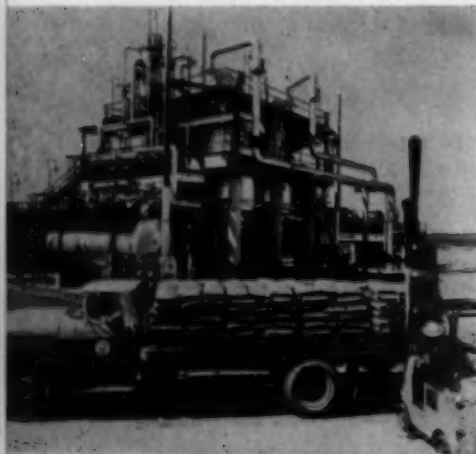
NEWS OF THE INDUSTRY

Plans for its fifth ammonia plant, in Big Spring, Tex., have been announced by **W. R. Grace & Co.** William J. Haude, president of Grace's Nitrogen Products Div., said the plant will be producing early next year and is expected to produce more than 60,000 tons of ammonia annually. Foster Wheeler Corp., New York, will design and build the plant. To adjoin the Big Spring, Tex., oil refinery of Cosden Petroleum Corp., the new plant will be operated for Grace by Cosden. Grace owns 53 per cent of the outstanding stock of Cosden. Haude said that the major market for the ammonia will be as fertilizer directly applied to the soil.

A new pesticide formulating plant at Dothan, Ala., has been established by **Niagara Chemical Div.** of Food Machinery and Chemical Corp. James M. Swilly, who had been a foreman at Niagara's Jacksonville, Fla., plant, has been named production manager at Dothan. Among the products to be made there are formulations of methyl parathion, malathion, sulfur, DDT, Sevin, ethion and Thiodan.

Apco petroleum products now are being refined and marketed by **Apco Oil Corp.**, Oklahoma City, Okla., successor to the refining, marketing and transportation operations of Anderson-Prichard Oil Corp.

A "Sweepstakes Trophy" has been awarded the Brea, Calif., plant of Collier Carbon and Chemical Corp. by the National Safety Council for having the finest safety program and one of the lowest accident rates of 668 western manufacturing plants of comparable size.



First order of packaged maleic anhydride was shipped in April from the new Richmond, Calif., plant of Oronite Div., California Chemical Co., subsidiary of Standard Oil Co. of California. The new plant, in the background, is the first facility constructed in the West to manufacture maleic anhydride.

"Big Blast in the Cotton Belt!" is the theme of **Velsicol Chemical Corp.**'s massive coast-to-coast sales support program featuring heptachlor, endrin and methyl parathion insecticides. Slogan for the cotton campaign is "\$1 gets you \$6." Running from April into August, the program will encompass key cotton states using radio, television, newspapers, billboards and magazines to tell the Velsicol story.

Seven representatives of **Atlas Powder Co.** subsidiaries, affiliates and distributors in Canada, England, Germany, Holland, Italy, Japan and Mexico recently completed an intensive five weeks' training course at Wilmington in the technology and applications of Atlas Chemical products.

Sponsored by Atlas' International Div., the course was conducted by personnel of the Chemical Product Development Dept. It included classroom sessions and lab work in such product areas as agricultural chemicals, cosmetics and pharmaceuticals, foods, textiles, plastics and specialty chemicals.



Atlas Group Leader Frank Black shows effect an insecticide concentrate has on steel strips after aging at 122 degrees F. in Atlas agricultural chemicals laboratory. Looking on left to right are: K. G. Ludwig (Germany); J. L. Plauche and Israel Gonzalez (Atlas International Div.); and D. B. Bruce (England).

Despite the wide range of native tongues, language proved no barrier for the seven "students." A working knowledge of English was a prerequisite for the course.

A contract for shaft sinking and underground construction for development of **Texas Gulf Sulphur Co.**'s potash beds near Moab, Utah, has been awarded to Harrison International. A contract for building a milling plant and other surface facilities was previously awarded to Sterns-Rogers Mfg. Co., already at work on the project. Capital expenditures for the entire project are estimated at \$30 million.

Schedules call for the shaft to reach

the potash formation in the latter half of 1962.

Union Oil Co. of California has purchased certain assets of **Pacific Chemical & Fertilizer Co.**, a Hawaiian corporation in the process of liquidation, for about \$6.5 million. The assets purchased include 10.4 acres in the industrial area of Honolulu and **Pacific Guano Co.**, a wholly-owned California subsidiary of Pacific Chem. & Fert.

Pacific Guano, a marketer of farm chemicals on the West Coast, will operate independently, with ownership vested in Union's subsidiary, Collier Carbon and Chemical Corp. Pacific Guano also owns a 60 per cent interest in Western States Chemical Corp.

Du Pont Co. has announced plans to build a multi-million dollar methanol plant on a 600-acre tract near Huron, Ohio. Annual capacity of the proposed plant would be about 30 million gallons. Plans call for start of construction late this year with completion in late 1962 or early 1963, according to Clark W. Davis, general manager of the company's Industrial and Biochemicals Dept.

Two broadcasting programs sponsored by **Texaco Inc.** have been announced as winners of 1960 George Foster Peabody Awards. The Texaco Huntley-Brinkley Report was selected as the outstanding television news program of last year, and the Texaco-Metropolitan Opera Radio Network won the award for radio public service.

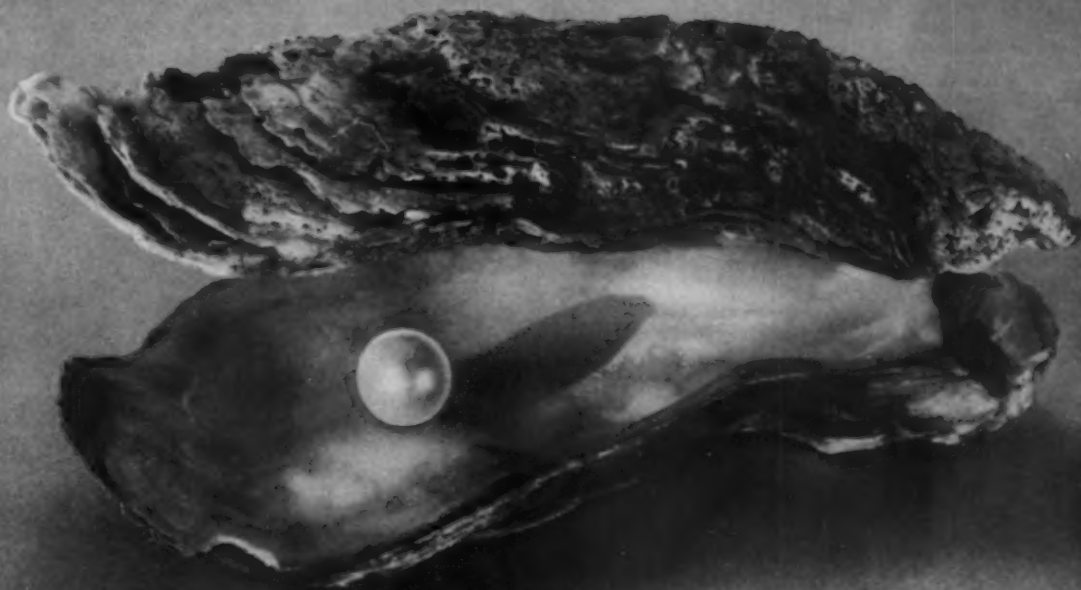
Fertilizer and fertilizer materials sold in Texas during the year beginning July 1, 1959, amounted to 708,036 tons, about 7 per cent higher than tonnage sold during the preceding year, according to a report by Dr. J. F. Fudge, state chemist.

Tonnage sold in Texas during the fall of 1960 was 966 tons higher than that sold during the same period of 1959, Fudge says. Sales of mixed goods were about 9 per cent lower, but materials sales were 5.3 per cent higher.

Ferro Corp., Cleveland, Ohio, has appointed **U. S. Borax** as its national sales representative for marketing of its fritted trace fertilizer supplement, FTE, in the domestic fertilizer industry. The announcement was made by Gene L. Bruton, general manager of the Ferro Agricultural Div.

J. F. Corkill, U. S. Borax marketing vice president, said the agreement with Ferro will provide improved sales and distribution facilities for FTE and will round out the line of fertilizer borate materials supplied by U. S. Borax.

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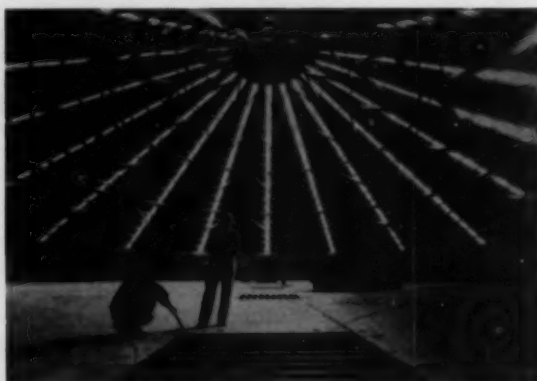
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NEWS OF THE INDUSTRY

One of three immense potash storage buildings at the Esterhazy mine and plant of International Minerals & Chemical Corp. (Canada) Ltd. Each building can hold 35,000 tons of finished product. The buildings are 200 feet in diameter and are the first laminated wood buildings to be designed as pure conical structures, IMC reports.



Aerial topdressing of rugged mountain pasture land has a good chance of becoming a standard practice in western North Carolina, according to Sam Dobson, extension pasture specialist at North Carolina State College.

"We have 500,000 acres of land that could benefit from aerial topdressing," Dobson said. "This is cleared and fenced land that is now averaging about 1,000 pounds of hay annually," he explained. "With proper lime and fertilizer it could produce 3,000 to 3,500 pounds."

The complex fertilizer warehouse being built for Ortho Div. of California Chemical Co. in Fort Madison, Iowa, will be the biggest bulk operating warehouse in the United States, when finished, according to J. Q. Cope, vice president—facilities & negotiations. Dimensions are 240 ft. by 600 ft. with a height of 80 feet. This is roughly comparable to the size of the United States capital building in Washington, D. C., without the dome and rotunda!

Cornland Manufacturing Co. has been licensed by TVA to use its recent developments in liquid fertilizer production.

An increase of three cents per unit of K_2O for its agricultural grades of muriate and sulfate of potash will become effective July 1 for the fertilizer year July 1, 1961 through June 30, 1962, announces **American Potash & Chemical Corp.**

"This is effectively the first general price increase in Trona agricultural potash in many years," the company said. "The increase adopted a year ago

merely restored prices to the levels at which they had been for a long period prior to 1957."

A bulk fertilizer mixing plant and bagged fertilizer warehouse has been built in Lebanon, Mo., by **Missouri Farmers Association**. Jim Forgey has been named its manager.

Mississippi Federated Cooperatives (AAL), Jackson, recently bought a fertilizer plant at Hattiesburg for \$200,000, according to a recent report, and will spend about \$200,000 more to modernize the plant.

"Specifications for Pesticides," second edition, has been published by the World Health Organization. Containing 523 pages, the clothbound manual may be purchased for \$10.00 from Columbia University Press, 2960 Broadway, New York City 27. The manual contains specifications established by WHO Expert Committees on Insecticides between 1950 and 1958 for important pesticides used in control of human diseases and for the equipment necessary to apply these products. WHO says it is intended to serve as a guide to both manufacturers and users of such products and apparatus.

About 15 per cent more fertilizer was registered for sale in Idaho last year than in 1959, according to a summary by Charles Painter, soils specialist of the University of Idaho extension service. Slightly more than 150,000 tons were registered for use in Idaho in 1960, an increase over 1959 of about 19,000 tons. The figures are for fertilizer on which tonnage tax was paid. Total value

of the 1960 fertilizer was about \$14 million.

About 80 per cent of the materials were dry carriers and 20 per cent liquid, Painter's summary said. In comparing 1960 and 1959 figures, Painter noted a slight increase in liquid carriers, more tonnage of straight phosphorus carriers, greater tonnage of nitrogen and phosphorus combinations, and a slight increase in fertilizers containing nitrogen, phosphorus and potassium.

"Improved financial conditions for farmers and ranchers are expected to prevail throughout 1961," the Agricultural Committee of the American Bankers Association reports, based on a semi-annual survey of agricultural credit. The bankers evidenced less concern than in previous years for the cost-price squeeze, and 95 per cent of the banks (4 per cent more than last fall) indicated willingness to increase their farm loan volume.

Government

More than three million tons of corn (102,991,000 bushels) worth \$96,085,000 were destroyed by the European corn borer last year, USDA estimates. The loss was 52 per cent greater than in 1959, and is about 2.6 per cent of the total U. S. crop. Greatest losses were in Iowa (31 million bushels), Nebraska (19 million bushels) and Illinois (13 million bushels).

"The U. S. Industrial Outlook for 1961" covering 91 selected industries is now available from the U. S. Government Printing Office, Washington 25, D.C. Among the industries covered in the 275 page book is the fertilizer industry. Prospects for 1961, review of 1960, background data and statistics are included. Price of the book is \$1.75.

"Air Pollution and Purification," a new OTS Selective Bibliography, lists 124 U. S. government research reports and translations of foreign literature on air pollution by nonradioactive fumes, industrial gases, smokes, aerosols and other contaminating agents. Subject categories include problems and effects of air pollution, studies in levels of pollution, and methods and equipment for air purification. It can be

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Cleanliness is another reason. Bags of Expanda-Kraft do not create as much dust and dirt as burlap bags. In addition, they print better. They're easier to read. And finally, bugs and rodents are less troublesome with bags of Expanda-Kraft.

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Kraft has the *highest cross-direction stretch* of the leading extensible papers now on the market. It can absorb rough impacts from any direction.

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NEWS OF THE INDUSTRY

purchased for 10 cents from Office of Technical Services, Business and Defense Services Administration, U. S. Department of Commerce, Washington 25, D. C. Order number SB-448.

Year-round research to find ways of controlling the **face fly** has been made possible by development of a laboratory method of rearing these flies, USDA has reported. John H. Fales and his coworkers of USDA's Agricultural Research Service have succeeded in propagating the insects through eight

generations, in an effort to build a colony large enough to permit experiments aimed at development of suitable control measures.

In studying habits, behavior and life cycle of these insects, the scientists have discovered that the face fly and house fly complete their life cycles in the same length of time. However, the face fly spends less time in the larval stage and more in the pupal stage of growth than does the house fly. It was confirmed that face fly females will lay their eggs only in fresh cow manure.

Chemicals

The witchweed cloud has its spot of sunshine, too. As a result of the intense spraying effort to kill witchweed, hundreds of farmers are becoming acquainted with the advantages of herbicides for the first time. A. D. Worsham, extension weed specialist at North Carolina State College, believes many farmers will stick with herbicides in the future, witchweed or not.

A similar report comes from South Carolina. L. H. Senn, assistant state entomologist at Clemson College, says the sharp increase in use of 2,4-D and other herbicides can be largely attributed to the "witchweed fight."

Monsanto Chemical Co.'s Agricultural Chemicals Div. is marketing a new, high-analysis fertilizer material developed to meet soil needs of crop and pasture land in certain midwestern and southwestern regions. Trade-marked **Nutrium**, the 29-14-0 prilled product—containing ammonium nitrate and phosphate—is being sold in bulk and in 80-pound bags.

Crop Rider 20% Aqua Granular is being introduced by Diamond Alkali Co. A granular herbicide for destruction of waterweeds, the product has been used in badly weed-infested lakes with excellent results and without harmful effect on fish, reports L. P. Scoville, manager of Diamond's Chlorinated Products Div.

Application is made from a raft or boat by attaching a fertilizer-type spreader to the end of the boat. Other methods include whirl-plate type of seeder, broadcasting by hand or spreading by helicopter. In some areas the product is applied on ice before spring thaw.

A new label claim granted by USDA permits use of **Thiodan** emulsifiable concentrate insecticide on pears for control of consperse stink bug through the petal fall stage. Niagara Chemical Div. of Food Machinery and Chemical Corp. said that previously applications were limited to pre-bloom period.

Thiodan can be used against two additional potato pests—potato psyllid and European corn borer—bringing to a total of ten the insects on which Thiodan can be used, on potatoes.

A price reduction on 2-Butene-1, 4-diol from 73 cents to 69 cents per pound in tank-car quantities has been announced by Antara Chemicals, a Div. of General Aniline & Film Corp. **Butenediol** is reported to be achieving increasing markets as an intermediate for

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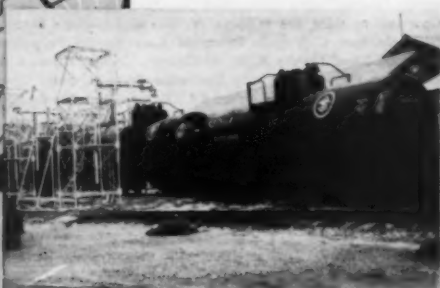
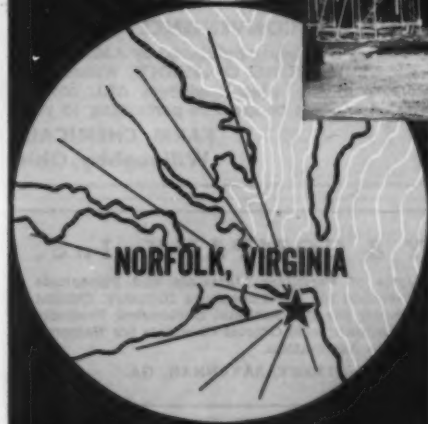
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NEWS OF THE INDUSTRY

polymers, agricultural chemicals, plasticizers, specialty plastics, electroplating additives and pharmaceuticals.

Union Carbide Chemicals Co. is marketing a new type of **Sevin Sprayable** insecticide formulation. It is an 80 per cent superfine wettable powder, designed for ground or air application in low-volume sprays on cotton.

Systox has been registered for use on apricots, plums and prunes to control aphids and mites, and on peppers to control aphids, reports Chemagro Corp., its manufacturer.

Associations Meetings

Synthetic Organic Chemical Manufacturers Association has moved its office to 261 Madison Avenue, New York City 16. Telephone number, MU 2-8128, remains unchanged.

Members of the fertilizer and pesticide industry have been invited to attend the annual meeting of the **Southern Association of Feed, Fertilizer and Pesticide Control Officials** at

the Lafayette Hotel, Lexington, Ky., June 5-7. A meeting for control officials only will be held Sunday night, June 4 and Monday morning. On Tuesday, a panel composed of Paul T. Truitt, NPFI, W. E. Glennon, AFMA, J. A. Noone, NAC, and F. Dallas Sparre, MCA, will discuss the work of their as-

sociations, especially as it relates to the work of control officials. The general session will continue Wednesday morning with talks on pesticide residues, what the states and Federal government are doing regarding pesticides, and a discussion of the Hazardous Articles Law.



Western Industry Advisory Committee of the National Plant Food Institute met recently in San Francisco to discuss the 1961-62 program and budget for the West and Pacific Northwest. Projects of greatest interest were Intensified Soil Fertility, Dealer Workshops and Soil Moisture-Fertility Relationships. Left to right are William W. Cline, American Potash & Chemical Corp.; Dr. M. H. McVickar and Les Hamilton, California Chemical Co.; Harold Ferguson, Balfour-Guthrie & Co., Ltd.; Charles Bourg, U. S. Steel Corp.; R. H. McGough, Collier Carbon & Chemical Corp.; Elwood Lentz, chairman, Western Phosphates, Inc.; Lawrence Roberts, Shell Chemical Co.; William Price, Swift & Co.; John Hall, Potash Co. of America; Ed Kitchen, U. S. Borax and Chemical Corp., and Raoul Allstetter, National Plant Food Institute.



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FARM CHEMICALS

NEWS OF THE INDUSTRY

Next year, on February 12 and 13, a **short course on fertilizer technology** will be held at Purdue University. Sponsor is the Soil Science Society of America. Chairman of the committee arranging for the short course is Dr. Malcolm H. McVickar, Ortho Div., California Chemical Co. Committee members include Dr. R. A. Krantz, University of California; Dr. R. D. Munson, American Potash Institute; Dr. L. B. Nelson, TVA; Dr. R. W. Starostka, Davison Chemical Div., W. R. Grace & Co., and H. H. Tucker, Sohio Chemical Co.

Purpose of the course is to bring together recent information on fertilizer technology and resources in the U. S. for use by college and industry men.

People

George V. Anderson & Associates announces appointment of James G. Bronson as vice president. Bronson was formerly associated with Allied Chemical Corp., Food Machinery and Chemical Corp. and American Cyanamid Co. Anderson & Associates are management recruiters and consultants.



Swift

Arizona Fertilizer and Chemical Co. Two long-time executives have been elected to positions of greater responsibility. Ted W. Swift is now a vice president, and Joseph G. Hartsig an assistant vice president. As a vice president Swift will continue to supervise production for the firm. Hartsig will coordinate purchasing, government contracts and sales,

wholesale sales, advertising and promotion.

The Best Fertilizers Co. Lisle W. Garner is named to the new position of assistant sales manager in charge of agricultural chemicals, and Al Nilsen becomes engineering advisor.

Chemagro Corp. has appointed Robert J. Smith, Jr., a technical sales representative, and assigned him to the eastern region, with headquarters at Montgomery, Ala.



Kaesche

Collier Carbon and Chemical Corp. has a new president. William C. Kaesche, previously executive vice president, succeeds Robert T. Collier as president. Collier moves up to chairman of the board of directors. Dudley Tower, president of Union Oil Co., has been elected a member of the board, filling the vacancy created by retirement of the former chairman, W. L. Stewart, Jr.

Diamond Alkali Co. Thornton F. Holder, director of research, died April 16 at his residence at Waite Hill Road, Willoughby, Ohio, following a heart attack. Holder, 50, has served as Diamond's director of research since 1956.



Hurlimann

Geigy Chemical Corp. Conrad G. Hurlimann has joined the firm as vice president and director, Charles A. Suter, executive vice president, has announced. Suter said that Hurlimann will assist at the planning and management level in the company's general expansion and

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NEWS OF THE INDUSTRY

growth. Hurlimann had been administrative vice president and director of Pfizer International, Inc.

W. R. Grace & Co., Nitrogen Products Div., has appointed Lloyd E. Lundahl, Jr., as general manager of Caribe Nitrogen Corp., San Juan, Puerto Rico. Grace manages the operation of Caribe under a management contract.



Beddoe

Great Western Chemical Co. Paul Beddoe recently joined the Agricultural Chemical Dept., reports Lee Hansen, department manager. Beddoe is located in Medford, Ore., where Great Western has a warehouse and sales office.

Hercules Powder Co. Dr. John H. Long has been elected a vice president and member of the Executive Committee.

International Minerals & Chemical Corp. C. J. Anstrand, sales manager of the industrial chemicals department, has been promoted to staff assistant to the vice president of the Technical Div. Paul W. Hiller succeeds Anstrand as industrial chemicals sales manager.

Koppers Co., Inc. Ralph H. Bescher

becomes assistant vice president in the Wood Preserving Div. He will continue to be assistant to the division general manager.

Monsanto Chemical Co. Ross E. Norton has joined the marketing department of the Agricultural Chemicals Div.

Niagara Chemical Div., Food Machinery and Chemical Corp. Four Midwestern sales representatives have been added to the staff: Kenneth M. Harrison will serve southwestern Indiana and western Kentucky; Robert T. Morgan, northern Indiana; Robert D. Shockey, southeastern Indiana and central Kentucky; and E. Dean Wolfe, Nebraska.

At the Middleport plant, Nelson Darroch takes the post of technical assistant to the production manager while Richard R. Heinze replaces him as chief chemist in quality control.



Burrell

Pittsburgh Plate Glass Co. J. Earl Burrell has been appointed vice president of operations for the Chemical Div. He has been general manager of operations since 1958 and previously was assistant to the vice president-operations.

Dwight R. Means, 63, formerly pres-

ident and chief executive officer of Pittsburgh Plate Glass International, S.A., died April 25, in Boston, Mass.

Signal Oil and Gas Co., Houston Div. Appointment of Thomas M. Moran as assistant manager of Chemical Sales in the Houston office has been announced.



Kennedy

Stauffer Chemical Co. John H. Kennedy, one of the pioneers of the agricultural chemicals business, retired in May from his position of assistant to the vice-president, Agricultural Chemicals Division, Stauffer Chemical. Kennedy has spent more than 45 years in industrial and agricultural chemical sales.

During the 20 years he was Stauffer's Eastern Sales Manager of Agricultural Chemicals, the company's ag chemical operations expanded more than 20 fold.

On retirement, he plans to "actively relax" as resident manager of Zipse's East Lake Camp, Oakland, Maine.

Texas Gulf Sulphur Co. Election of E. F. VanderStucken, Jr., as a director of Texas Gulf Sulphur Co. has been announced by President Claude O. Stephens.



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CIRCLE 130 ON SERVICE CARD

COMPATIBILITY

Pesticide formulators have found that many of the new toxicants are compatible with only a few diluents, while some require special stabilization of the diluent. Active ingredient deterioration caused by the acid response centers of diluent particles has been a major problem. The diluent Pyrax ABB requires no stabilization with many of the new pesticides. In addition, it has an optimum bulk density which eliminates the use of several diluents to obtain proper bulk flow characteristics. A handy chart listing toxicants and hormones known to be compatible with pyrophyllite and/or kaoline clay has just been published by R. T. Vanderbilt Co. A copy will be sent to you if you will

CIRCLE 131 ON SERVICE CARD

Process Equipment

ONE STEP OPERATION

Pulverizing and precise end production classification are combined into one operation by Pulver-Mills. The air-swept principle of operation (special intake vane design "whirls" vertical air flow) enables both control of attritional heat and integral air classification of end product. Precise selection of desired particle size is accomplished by an adjustable selector bar system. Unique deflector wall design "bounces" any partially reduced material back into the Pulver-Mill grinding zone—makes the reduction process fast and highly efficient. Sturtevant Mill Company's complete line of Pulver-Mills is covered in Bulletin No. 093. For your copy,

CIRCLE 132 ON SERVICE CARD

BULK BLENDING UNIT

Versatility is the key word to describe the design of the new Big Chief Bulk Blending Unit manufactured by Fertilizer Engineering & Equipment Company. The result of an extensive study accounted for the creation of this three-section bulk blending unit. Heading the list of features is the first section which is a highly compact, semi-enclosed unit consisting of a bucket elevator head, screen, pulverizer, walk and railing, hoppers, valves, and chute directing the material for numerous and different applications. The second section consists of the elevator intermediates; the third,

a dial head weigh hopper with chute or, if no pit is desired, feeder screw to the elevator boot. To learn how the Big Chief will custom fit your operation,

CIRCLE 133 ON SERVICE CARD

ELECTRONIC TRACER

A new electronic tracer which uses templates prepared by conventional drafting methods has just been developed. The Air-cotron Model "J" uses a small light-sensitive element located in the scanning head to follow the template line of the part to be cut. Width of the line must be maintained between .020 and .040 inches. The tracer head is mounted on the operating bar of the cutting machine and automatically provides the desired motion of the torches during the cutting operation. Further information on the Air-cotron Model "J" electric tracer, developed by Air Reduction Co., Inc., may be obtained by

CIRCLE 134 ON SERVICE CARD

Materials Handling

WEIGHT SENSING

Processors will want to secure copies of a new manual designed to show how the principle of weight sensing, or measurement of force, can be utilized to perform a wide variety of production and quality control functions. The Shadograph scale principle consists essentially of a one-to-one ratio pre-determined weight scale with a transducer for converting lever movement into an electrical readout signal. For your copy of this handy reference manual, published by Exact Weight Scale Company,

CIRCLE 135 ON SERVICE CARD

AUGER FILLING

Auger filling utilizes the positive mechanical screw principle to convey material vertically downward from a hopper through a tube into a container. The auger is driven by an electric motor and controlled through a combination clutch and brake. Seven types of augers have been attractively displayed in a recent bulletin prepared by Food Machinery and Chemical Corporation. Illustrated are the following types: standard straight, fluted, taper-tipped, large-top straight, large-top taper-tipped, spiral-type centrifugal, and pin-

type centrifugal. Auger filling equipment has proved to be particularly effective in filling products which tend to bridge and which are dusty. To learn how you can adopt auger filling to your operation,

CIRCLE 136 ON SERVICE CARD

Packaging

ROLE OF PLASTICS

The spectacular growth of plastics in packaging is the subject of a new booklet entitled "Packaging—Last Step in Manufacture, First Step in Sales." The booklet describes many of the ways in which plastic is being used today in the broad spectrum of industrial and commercial packaging. Included is a concise explanation of chill-roll extrusion, one of the more recently developed techniques for converting plastics into packaging materials; a resume of the characteristics and growing use of color in this field; and an illustrated description of various methods employed in imprinting on transparent film. To add this booklet, published by Plastics Division, Eastman Chemical Products, Inc., to your reference library, simply

CIRCLE 137 ON SERVICE CARD

A COMPLETE LINE

The ten types of packaging machinery produced by Food Machinery and Chemical Corporation are the subject of a new four-page illustrated brochure. Complete details on automatic auger fillers; semi-automatic auger fillers; carton filling and sealing equipment; pouch forming, filling and sealing equipment; contour wrapping equipment; double-package makers; box and tray forming equipment; transparent lid equipment; setup box equipment; package casing equipment; and high speed check weighing equipment are included in the brochure. For complete information

CIRCLE 138 ON SERVICE CARD

Application Equipment

BROD-KASTOR

Apply fertilizer fast and accurately with Brod-Kastor, manufactured by the Belt Corporation. Brod-Kaster spreads pelleted and granular fertilizers approximately 50 feet wide. The uniform pattern blends at swath edges for proper material placement. The easily loaded hopper holds over 1800 pounds of 60-pound per cubic foot material. The exclusive vibrating hopper bottoms assure constant flow of material through ports; makes hopper extremely easy to clean. On-off control of material flowing to fans is easily operated from the tractor seat. Brod-Kastor attaches to any tractor. For full details

CIRCLE 139 ON SERVICE CARD

See page 66 for information on
these Reader Service Numbers:

140—Flexible Working Map

142—New Approach

141—Free Flowing

143—Rapid Spread

To use Reader Service Card on page 18: Circle number of literature you want. Print or type your name, position, company and address. Clip and mail.

Sturtevant Equipment

NEWS



Sturtevant Pulver-Mill® does in one step what used to take two

Designed for fine grinding into the micron range and precise end product classification — all in a single operation, Sturtevant Pulver-Mills are proving highly effective for pulverizing soft to medium hard non-metallic materials. ■ *In Ag chemicals*, Pulver-Mills have helped one blue chip company enter and compete profitably in the lucrative 95% 325 mesh market . . . *In the milling field*, too, Pulver-Mills are increasing yield while also improving uniformity of particle size . . . *And pilot runs* at Sturtevant's laboratory indicate that Pulver-Mills can lower production costs, improve quality control, in the pulverizing of dozens of other materials. ■ *Air-swept principle of operation* (special intake vane design "whirls" vertical air flow) enables both control of attritional heat and integral air classification of end product. Precise selection of desired particle size is accomplished by an adjustable selector bar system. Unique deflector wall design "bounces" any partially reduced material back into the Pulver-Mill grinding zone — makes the reduction process (revolving impactors passing between fixed wall impactors) fast, highly efficient. ■ *Now available in three models* with capacities ranging from several hundred pounds per hour to 7½ tons per hour, Sturtevant will welcome the opportunity to test-run any soft to medium hard non-metallic material you may be working with.

For further information, send for Sturtevant Bulletin No. 093. Write Sturtevant Mill Co., 161 Clayton St., Boston 22, Mass.

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NEW & NOTEWORTHY

FLEXIBLE WORKING MAP

The map pictured here is imprinted on a 36x48-inch perforated 16-gauge steel panel and shows more than 300 key cities. States and cities are distinctly



indicated but do not interfere with the data to be added on this versatile map from Power Dispatchers Equipment Co.

Special scratch-proof, washable green finish makes possible the use of marking inks, tapes, magnets, and pressure-sensitive materials. These materials can be left on indefinitely or removed at any time—all without marring or damaging the surface of the map.

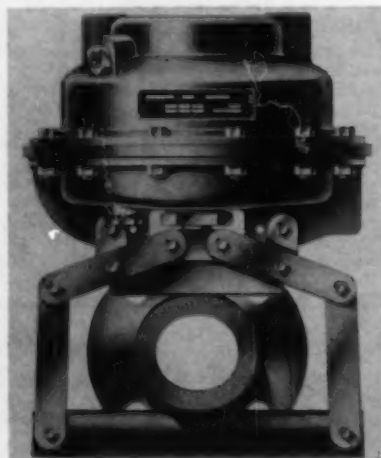
For complete information about this versatile map,

CIRCLE 140 ON SERVICE CARD

FREE FLOWING

A "ful-flo" Flex Valve to control highly abrasive slurries and corrosive materials in locations considered too hazardous or inaccessible for manually operated valves is now available.

The automatic valve has a simple pipe-like body which provides full capacity and unobstructed flow. Anything



that flows through a pipe will flow through this Flex Valve. Its smooth bore minimizes incrustation, permitting easy cleaning by tapping with a mallet. It

will not freeze in outdoor service. In highly corrosive and abrasive applications the Flex Valve has outlasted metal valves 11 to 1.

For complete information about the Flex Valve developed by Farris Flexible Valve Corp.,

CIRCLE 141 ON SERVICE CARD

NEW APPROACH

A new approach to vaccine production in which the liquid vaccine material is freeze-dried within its final container has been announced. Better distribution of virus particles is claimed for this new process called "SoluVac." The new vaccine will now afford greater convenience as well as efficiency in poultry vaccination. In the accompanying picture, "SoluVac" is shown at the left. It has a honeycomb-cake appearance as it



is dried in the vial. The vaccine on the right is the older form of vaccine in a flame-sealed ampule.

For further information about this new process developed by Dr. Salisbury's Laboratories,

CIRCLE 142 ON SERVICE CARD

RAPID SPREAD

A new liquid fertilizer spreader called Rapid Spread is now on the market. The new spreader operates on compressed air, and discharge is in the form of solid droplets rather than the conventional mist spray. These heavier "raindrop" particles can be spread more precisely, and unlike the mist spray, don't drift away in the wind.

The Rapid Spread is designed for mounting on a regular flat-bed truck or wagon. Attached hooks allow it to be lifted into place and removed with ease—the entire operation can be done in about 10 minutes. Further details about this new spreader introduced by Baughman Manufacturing Co., Inc., will be sent to you if you

CIRCLE 143 ON SERVICE CARD

FARM CHEMICALS

Suppliers

Briefs

Blaw-Knox Co. has named Harold M. Small manager of the Buflovak Equipment Div., Buffalo, N. Y. Small had been sales manager of the division.

Chase Bag Co. announces appointment of C. J. Dwyer as general traffic manager. Formerly assistant to the general traffic manager, Dwyer continues to locate at Chase traffic department headquarters in Chicago.

Dorr-Oliver Inc. Charles M. Comstock, advertising manager, has been named manager of the newly formed CompleTreator Sales Div. George F. Lambeth, sales specialist, replaces Comstock with the new title of advertising and publicity manager.

Dodge & Olcott has moved its Boston sales office to 600 Main St., Waltham 54, Mass.

Vulcan International, S. A. has been formed for overseas management and manufacture, according to Gordon D. Zuck, president. Headquarters will be in Panama City, Republic of Panama. "Two overseas locations are under negotiations now and are expected to be announced shortly," Zuck said.

Calendar

June 5-7. Association of Southern Feed, Fertilizer and Pesticide Control Officials, annual meeting, Lafayette Hotel, Lexington, Kentucky.

June 5-8. International Instrument-Automation Conference and Exhibit, Toronto, Canada. Conference sessions at Royal York Hotel, exhibit at Queen Elizabeth Hall June 6-8.

June 6-7. Georgia Plant Food Society, summer meeting, Wanderer Motel, Jekyll Island, Ga.

June 8-10. Manufacturing Chemists' Association, annual meeting, The Greenbrier, White Sulphur Springs, W. Va.

June 11-14. National Plant Food Institute, annual convention, The Greenbrier, White Sulphur Springs, W. Va.

June 18-21. Eastern Section, Canadian Society of Agronomy; Eastern Membership, Canadian Soil Science Society; Northeast Branch, American Society of Agronomy, joint meeting, Redstone Campus, UVM, Burlington, Vermont.

June 25-28. American Society of Agricultural Engineers, summer meeting, Iowa State University, Ames, Iowa.

June 27-29. 12th Annual Pacific Northwest Regional Fertilizer Conference, Marion Motor Hotel, Salem, Ore.

July 5-7. Midwest Branch, American Society of Agronomy, meeting, University of Wisconsin, Madison.

July 16-17. Plant Food Institute of North Carolina and Virginia, annual meeting, Asheville, N. C.

July 18-19. Annual Summer Fertilizer Conference, sponsored by Auburn University and Alabama Soil Fertility Society, Inc., Auburn University Campus, Auburn, Ala.

July 19-21. Southwest Fertilizer Conference and Grade Hearing, Galvez Hotel, Galveston, Tex.

August 10-11. Mississippi Soil Fertility and Plant Food Council, annual meeting, Biloxi, Miss.

August 16-18. Agricultural Relations Council Seminar, The Woodner Hotel, Washington, D. C.

August 16-20. Canadian Fertilizer Association, annual convention, Manoir Richelieu, Murray Bay, Quebec.

August 29. Agricultural Engineering Field Day, Brookings, South Dakota.

September 3-8. American Chemical Society, national meeting, Chicago, Ill.

September 5-8. National Chemical Exposition, sponsored by American Chemical Society Chicago section, International Amphitheater, Chicago, Ill.

October 4-6. Southeastern Fertilizer Conference, Atlanta Biltmore Hotel, Atlanta, Ga.

October 9-11. Western Agricultural Chemicals Association, annual meeting, Hotel Claremont, Berkeley, Calif.

October 12-13. Northeastern Fertilizer Conference, Schine Inn, Chicopee, Mass.

October 29-November 1. National Agricultural Chemicals Association, 28th annual meeting, The Homestead, Hot Springs, Virginia.

November 2-3. Pacific Northwest Plant Food Association, annual convention, Hotel Gearhart, Gearhart, Ore.

November 6-7. Washington State Weed Association, annual weed conference, Chinook Motel & Tower, Yakima, Wash.

November 8-10. Fertilizer Industry Round Table, Mayflower Hotel, Washington, D. C.



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"Cross Fertilizing" ideas needed

Is this the great era of the goof-off, as the president of one of the largest advertising agencies called it in that famous article appearing some time ago in *Readers Digest*?

There's no doubt about it—the man had a point. But he probably didn't know about the new breed of men behind the live wire fertilizer-pesticide operations we've been featuring the past few issues . . . or the "pioneers" of the liquid fertilizer industry . . . or the O. M. Scott marketers . . . or the small "independents" bucking large co-ops in some areas.

"There's a need on the part of the farm chemicals industry to look ahead with the farmer and help steer him toward planning . . . to help him face the many "make or break" decisions with which he must deal everyday."

The above words appeared on this page once before, when we attempted to explain the purpose behind a series of articles we were running about independent pesticide and fertilizer companies in the Great Northwest. We must admit that these small companies were our "sentimental favorites" because they were up against tremendous odds. But we were also careful to point out:

"FARM CHEMICALS has never come out for or against any particular type of marketing organization—but rather for "good orderly marketing that assures a profit for the organizations.

"There are many reasons for the publication of "success stories" such as we've been running recently—aside from the fact that we like to consider this magazine as a champion of the free, competitive enterprise system—where individuals and groups are rewarded for their unusual foresight, ingenuity and efficiency."

We feel now, as we've always felt, that *the man who is qualified* (possesses a good agronomic background, *plus good business sense* and is "willing to work like a fool") can build a good business on the basis of the *genuine guidance* he can offer farmers.

This is the marketing concept simplified! In the past two years we've tried to explain the marketing philosophies of the Goliaths—but we've also included a few Davids. We've explained how Monsanto possessed an "image problem." So they reorganized to *establish firmly the name of Monsanto as a producer of SUCCESSFUL farm chemicals.*

Then there was Niagara with divisional headaches. They felt the need to decentralize and this meant retraining. Volume was replaced by the term *profit.*

Ortho Division of California Chemical Company had a problem, too. It was only about five years ago that they added fertilizer products to their line. Should the men who had serviced the agricultural area sell fertilizer? It would seem "logical" that the latter would be a good idea. When pesticides are not being sold, fertilizer can be sold.

However, their marketing survey may soon come up with a *different* answer. A survey team is looking into the various segments of this so-called "natural operation" and Ortho may decide to *segregate* the fertilizer function from pesticides!

They aren't playing this game by hunch. They're depending on *market research* for their answers. What works for one farm chemicals company may prove to be "bad medicine" for another.

A lot of people are worried about co-ops. In fact, they're downright afraid of them. FARM CHEMICALS doesn't go along with this thinking. The record of co-ops shows that they have their problems, too. What the fertilizer industry needs more than anything is "cross fertilizing ideas." The big threat on the farm chemicals scene is not co-ops, but *stagnation.*

We are impressed by the food industry's concern about its future (and who should have a better one?)

The food industry is contributing to a special Food Marketing Management Program at Michigan State University. Here are three objectives of that program:

1) To provide an outstanding business curriculum with major emphasis on mass marketing management for the multi-billion dollar food industry, which has identified itself with the emergency need for high qualified executive manpower to assure profitable dollar merchandising.

2) To attract men to our entire industry—retailers, wholesalers, brokers, voluntaries, co-ops and chains, as well as manufacturers—to assure an environment of . . . "cross fertilizing ideas."

3) To create comradeship among future leaders of the industry which will stimulate sharp exchanges of thought and experience while they are on the campus and carry through to valuable co-operation in their competitive futures."

We think that the farm chemicals industry ought to be doing a little more thinking about its "men of tomorrow." Is it difficult to visualize our industry sponsoring a program which may help build co-ops—like the food industry is doing? Well, we prescribe the theory that has made O. M. Scott's sales triple since 1955 (earnings up nearly *ten times* in the same period.)

Quoting *Forbes*, "Scott brass freely concede that competition has never been fiercer. . . . But even rougher competition fails to ruffle Scott men. Said one company executive recently:

"We used to have to pay for all the lawn promotion in the U. S. Now others are doing some of it, and that doesn't hurt our feelings at all."


EDITOR

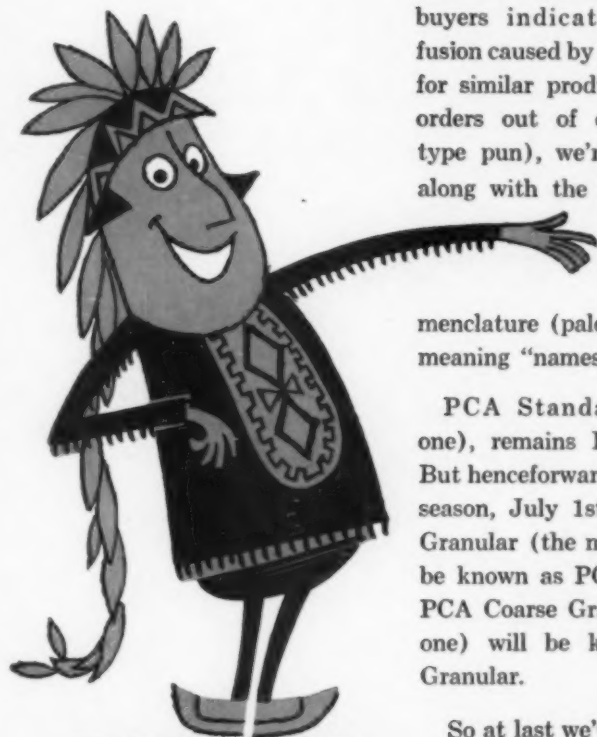
We're name dropping

but... Big Chief Kay-Two-Oh is only trying to impress you with the fact that all sizes of our 60% Muriate of Potash, by ANY name, are the best bet for your manufacturing operations.

At a recent pow-wow, a special committee of the National Plant Food Institute suggested that distress smoke signals from buyers indicate (ugh!) confusion caused by different names for similar products. To bring orders out of chaos (Indian-type pun), we're happy to go along with the rest of the industry in standardizing our nomenclature (paleface-type word meaning "names").

PCA Standard (the little one), remains PCA Standard. But henceforward, as of the new season, July 1st, PCA Special Granular (the middle one) will be known as PCA Coarse, and PCA Coarse Granular (the big one) will be known as PCA Granular.

So at last we've answered the question: What's in a name? Convenience for you in ordering from any source. But for top quality potash, and top service, be sure to order from PCA, top man on the totem pole.



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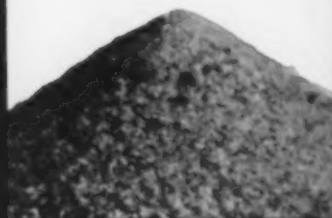
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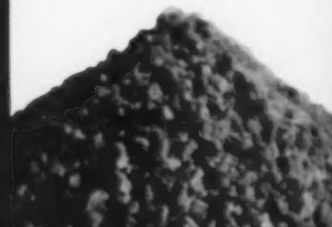
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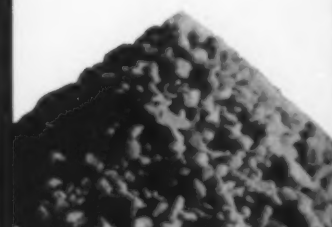
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